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Volume 24 SEPTEMBER 1955 Number 9

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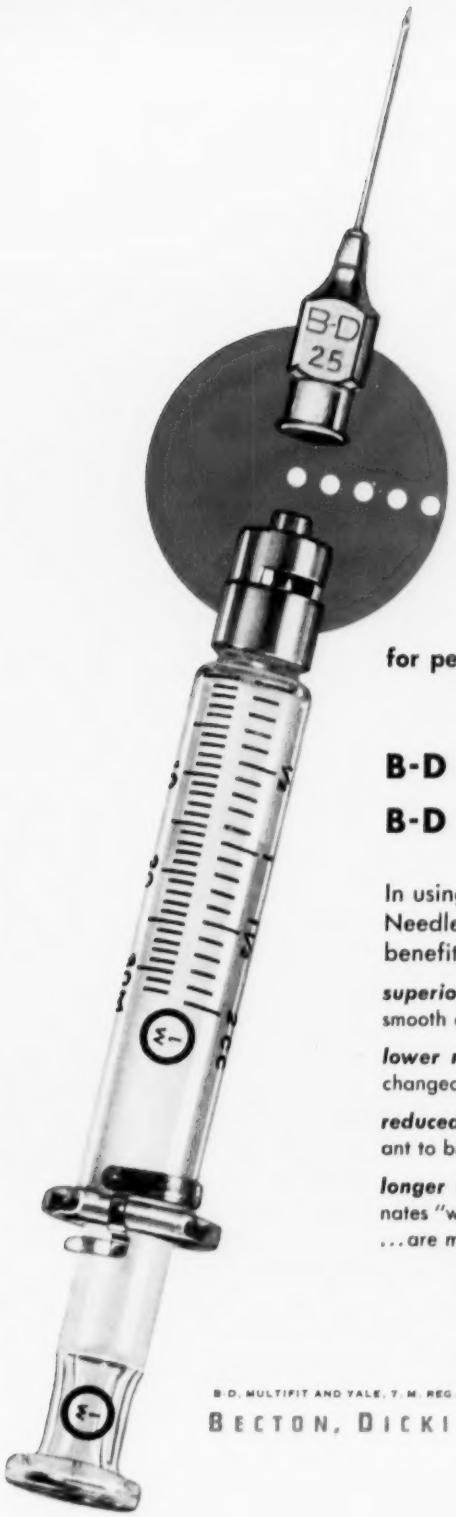

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This Journal is dedicated to the advancement of sound industrial medicine, including the surgery of industrial trauma. To that end its varying contents will embrace scientific papers, reports, digests, news items and official statements, together with editorial comment. The editorial policy is to avoid undue censorship. Some contributions ably prepared will be published although contravening the personal opinions of the editors. Care will be exercised in checking the accuracy of known facts, as printed, but in all other respects statements and opinions are those of the author and may not be shared by the editors. On any article, the editors reserve the right to comment favorably or otherwise, in the current or any subsequent issue. On this basis, contributions are invited. The opinions expressed in any contributions, including the editorials of this Journal, do not necessarily reflect the attitude or opinions of any associated organization.

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CARL U. DERNEHL, M.D., Medical Director, Carbide and Carbon Chemicals Company, Texas City, Texas, has been appointed Assistant Medical Director of Union Carbide and Carbon Corporation, New York. His appointment was effective July 1, 1955. ROY E. JOYNER, M.D., who has been associated with Carbide and Carbon Chemicals Company since 1951 has been transferred from the chemicals plant in South Charleston, West Virginia, to succeed DR. DERNEHL at Texas City.

K. E. DOWD, M.D., Chief Medical Officer of the Canadian National Railways and Trans-Canada Air Lines, was elected President of the Aero Medical Association at its 1955 Annual Meeting in Washington. He is the second Canadian to be elected head of this international organization composed of some 2,000 medical officers engaged in civil

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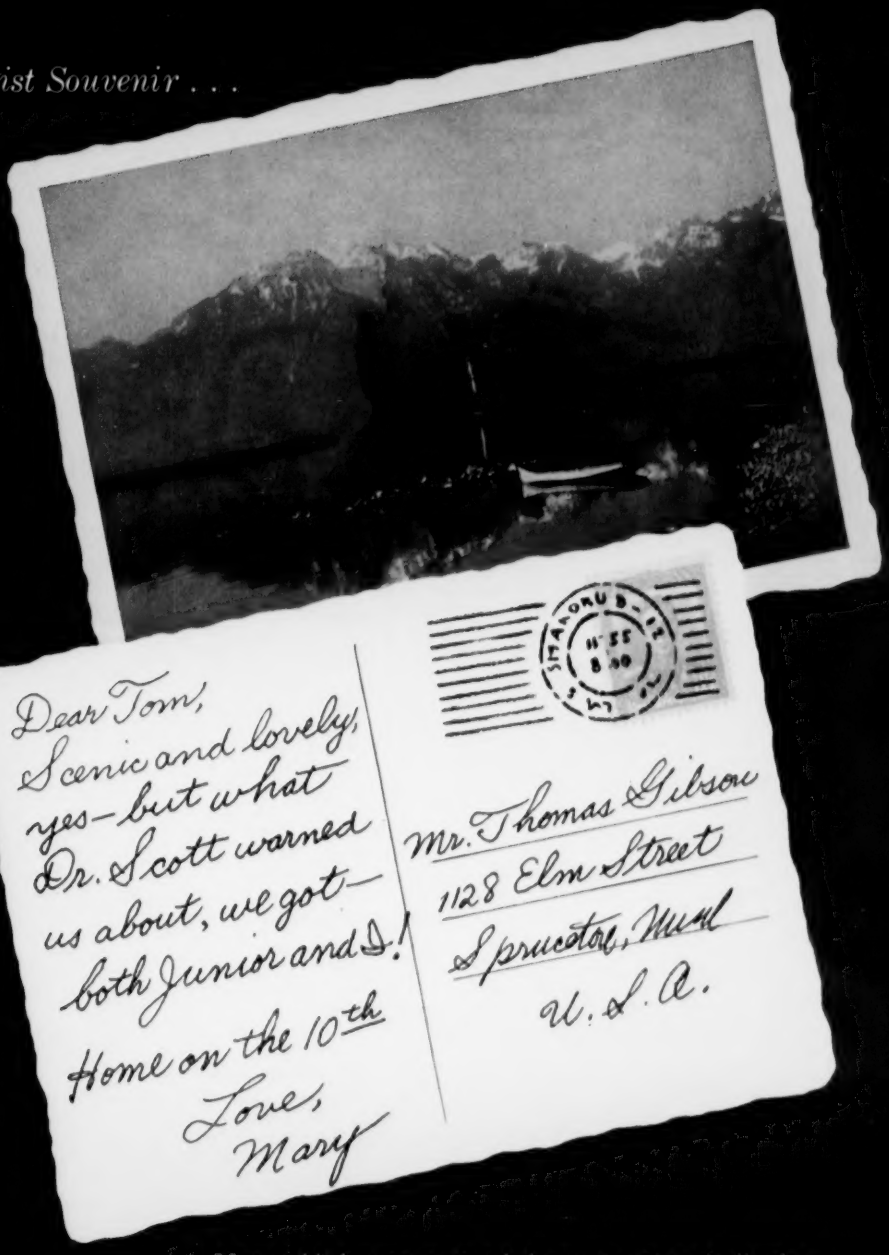

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and military aviation problems. DR. DOWD has been associated with aviation medicine since the inauguration of Trans-Canada Air Lines in 1937. He is a past president of the Airlines Medical Directors Association and of the International Air Transport Medical Panel. During World War II, he served as an honorary wing-commander with the R.C.A.F. Medical Branch, Medical Consultant on civil aviation to the R.A.F. Ferry Command. A graduate of McGill University in 1923, DR. DOWD is a Fellow of the American College of Surgeons and also holds a fellowship in Aviation Medicine. He was recently certified as a specialist in Aviation Medicine by the American Board of Preventive Medicine. The Aero Medical Association includes many research groups investigating the problems of high altitude flying, space medicine and other aviation problems.

THE SECTION on Occupational Surgery of the International College of Surgeons will hold its meeting in Philadelphia at the time of the Twentieth Anniversary Congress of the College, Wednesday, September 14, 1955, at 1:30 P.M. The program will be as follows: "Soft Tissue Injuries of the Neck"—M. E. LICHTENSTEIN, M.D., Chicago; "Plastic Surgery in Industrial Trauma"—C. L. STRAITH, M.D., Detroit; "Priority in the Management of Multiple Injuries"—J. L. LINDQUIST, M.D., Chicago; "Management of Severe Ankle Fractures"—WILLIAM H. CASSEBAUM, M.D., New York City. A. H. WHITTAKER, M.D., Detroit, is Chairman of the Section, and CHESTER C. GUY, M.D., Chicago, is Co-Chairman.

THE Committee on Industrial Health of the West Virginia State Medical Association, in its report (*West Virginia Med. J.*, August, 1955), requests consideration and approval of certain recommendations among which are the following: "That practicing physicians be urged to become familiar with local or regional industries relative to their operations and hazards and that industries be encouraged to invite members of the medical profession to visit their various plants" . . . . "That individual physicians interested in the special field be encouraged to join the Industrial Medical Associa-

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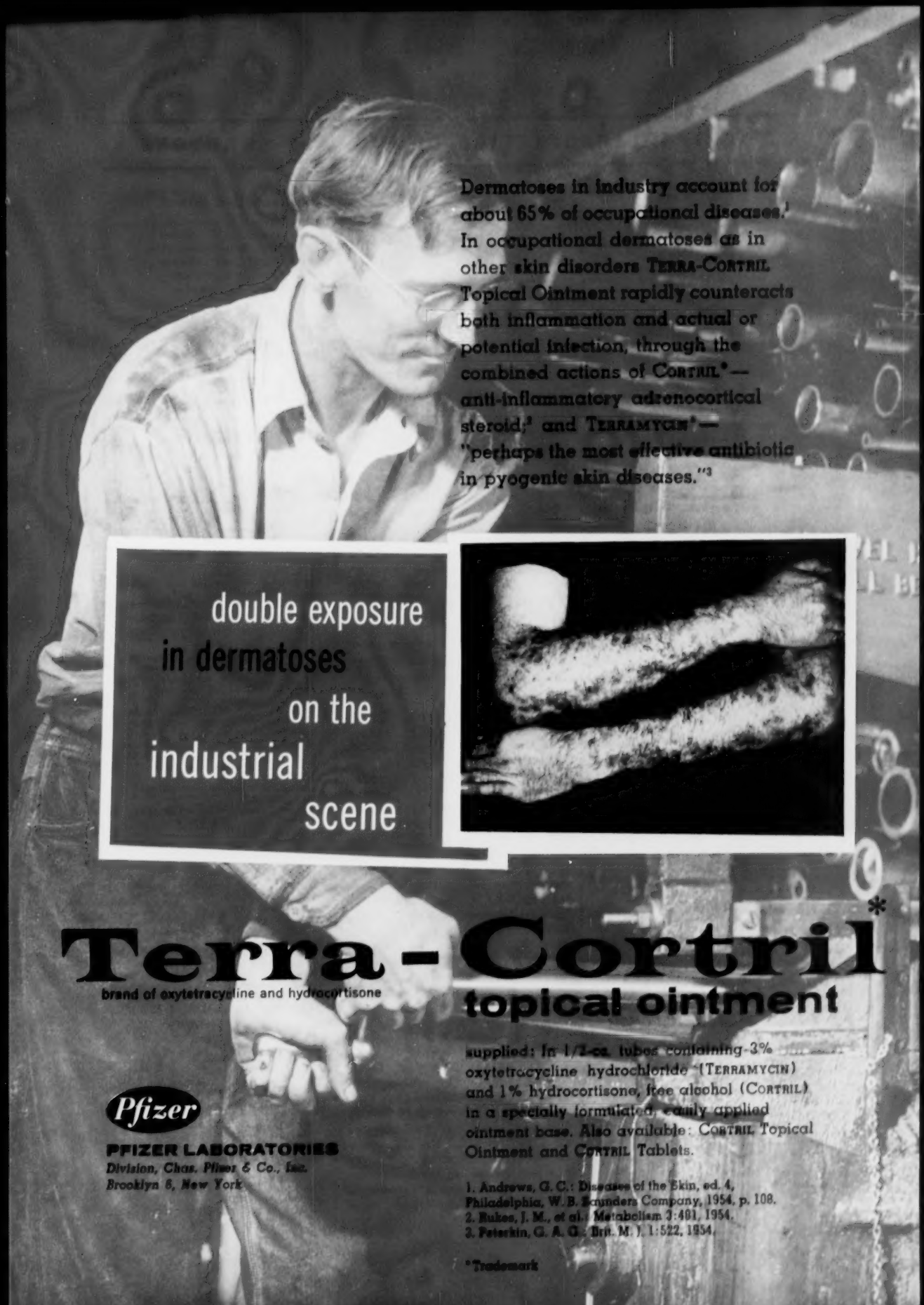

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1. Andrews, G. C.: Diseases of the Skin, ed. 4, Philadelphia, W. B. Saunders Company, 1954, p. 108.
2. Rukes, J. M., et al.: Metabolism 3:401, 1954.
3. Peterkin, G. A. G.: Brit. M. J. 1:522, 1954.

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68th Annual Meeting, April 10-12, 1956, at the Drake Hotel, Chicago

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Component Society of the Industrial Medical Association.

tion. A component group has been established recently as the Industrial Medical Association of Pittsburgh, and solicits participation of West Virginia physicians."

ENGINEERS, physicians, and public heath workers gathered in Austin May 14 for the University of Texas' second Industrial Hygiene Conference. Three members of the Texas Medical Association, DRS. D. P. LANGENOUR, Dallas; HENRY A. HOLLE, Austin; and C. U. DERNEHL, Texas City, participated in the program.

—*Texas State J. Med.*, June, 1955.

WHEN the Key Men's Club of the Fred Rueping Leather Company, Fond du Lac, held its 100th Meeting on March 22, physicians who had served the company as members of the Reuping Medical Center were honored. DR. W. J. WALDSCHMIDT was the first physician to serve the Center, and at present DR. DAVID SMITH is in charge. Fond du Lac physicians who have served the Center and who were present at the banquet were DRS. W. J. WALDSCHMIDT, H. A. DEVINE, K. K. BORSACK, W. J. WOJTA, J. S. HUEBNER, and J. C. SWAN. Physicians unable to attend were DRS. J. C. DEVINE, E. V. SMITH, FRANK YORDY, ROBERT SCHROEDER, and DAVID SMITH.

—*Wisconsin Med. J.*, June, 1955.

H. GLENN GARDINER, M.D., Medical Director of Inland Steel Company, and immediate Past President of the Lake County Heart Association, was honored at a dinner at a Highland restaurant, August 8. DR. GARDINER has just completed three consecutive one-year terms as President of the Heart Association, and

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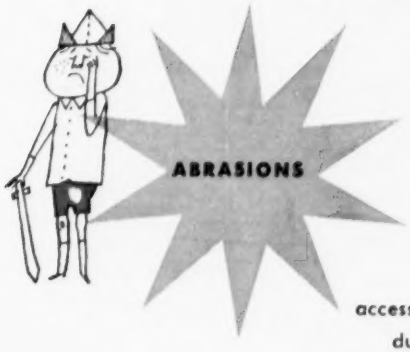

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continues to serve as a member of the Executive Committee and the Board of Directors of the Northwest Heart Foundation, Inc., formerly the Lake County Heart Association. In addition, he is a member of the Board of Directors and the Executive Committee of the Indiana Heart Foundation, parent organization of the local heart groups. DR. GEORGE COOK, Hammond, Past Honorary President, and President prior to DR. GARDINER, presented him with a plaque, a gift of the individual Board members in appreciation of his untiring efforts and devotion in behalf of the Heart Association. DR. A. LEE HICKMAN, JR., President of the Northwest Indiana Heart Foundation, paid tribute to DR. GARDINER for his devoted service. In addition, he expressed a desire for DR. GARDINER'S continued guidance in matters of concern to the Foundation. Those honoring DR. GARDINER included past and present members of the Board of Directors.

—Hammond, Indiana, Times, August 10, 1955.

RUTHERFORD T. JOHNSTONE, M.D., Los Angeles, will address the Annual Meeting of the Utah State Medical Association this month at Salt Lake City. He will speak on two subjects: "Industrial Medicine," on Thursday, September 8, and "Occupational Diseases: Their Diagnostic Approach" on Saturday, September 10.

UNITED STATES Rubber Company's main hospital, Water Street, Naugatuck, Connecticut, will be the scene of a Symposium on Industrial Health on September 22, under the auspices of the Committee on Industrial Health of the Connecticut State Medical Society. The program will include "Low Back Conditions Found on Pre-employment Physical Examination as Related to Industrial Liability," by DAVID M. BOSWORTH, M.D., New York; "Treatment of Hip Injuries," by FREDERICK R. THOMPSON, M.D., New York; "Secondary Repair in Severe Industrial Hand Injuries," by J .WILLIAM LITTLER, M.D., New York; and "Hematic and Neoplastic Health Hazards in the Rubber Industry," by WILHELM C. HUEPER, M.D., Bethesda, Maryland.

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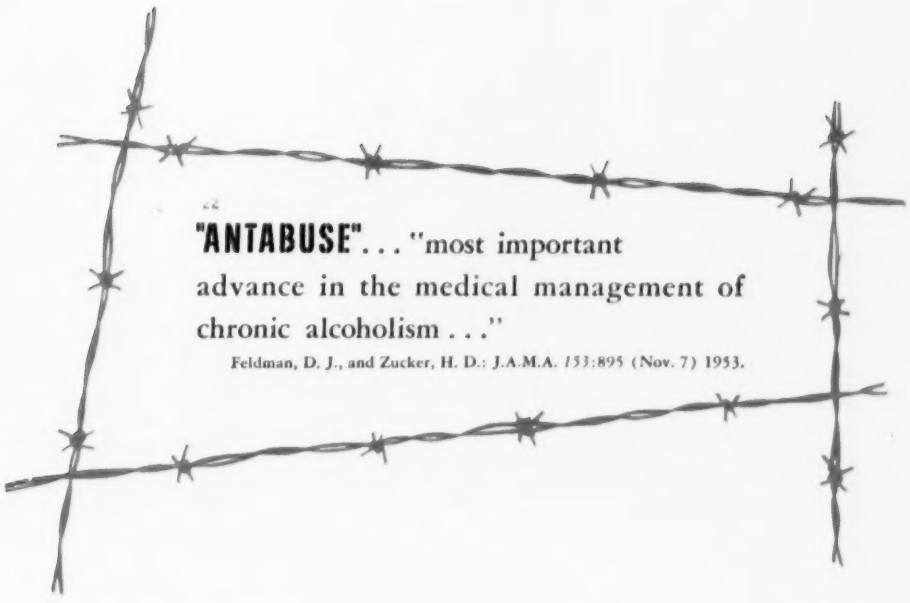
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Symposium on Coal Workers Pneumoconiosis, October 4, 1955. OSCAR A. SANDER, M.D., Consultant Staff of Columbia Hospital and Milwaukee General Hospital, Associate Professor of Medicine, School of Medicine, Marquette University, Milwaukee, is General Chairman, and the guest speakers include: LAWRENCE B. BERGER, Chief, Health Branch, Bureau of Mines, Department of Interior, Pittsburgh; EDWARD A. GAENSLER, M.D., Visiting Thoracic Surgeon, Boston City Hospital; JOHN CARRY GILSON, ESQ., O.B.E., M.D., M.R.C.P., Director of the Pneumoconiosis Research Unit, Llandough Hospital, Penarth, Glamorgan, Director, Pneumoconiosis Unit, United Kingdom; ADOLPH G. KAMMER, M.D., Head of the Department of Occupational Health, Graduate School of Public Health, School of Medicine, University of Pittsburgh; J. E. MARTIN, JR., M.D., Head of the Department of Medicine, Golden Clinic, Elkins, West Virginia; THOMAS PARRAN, M.D., Dean of the Graduate School of Public Health, School of Medicine University of Pittsburgh; FRANK FRINCI, M.D., Kettering Laboratory, College of Medicine, University of Cincinnati; DAVID H. WATERMAN, M.D., President of the Knoxville Chest Group; Attending Thoracic Surgeon Fort Sanders Hospital, East Tennessee Baptist Hospital, St. Marys Hospital, Knoxville.

HARRY B. BURR, Administrator of Medical Services for Westinghouse Electric Corporation, Pittsburgh, has become a member of the Board of Industrial Advisers of the Occupational Health Institute. This is the nonprofit organization established to guide industrial managements in the development of constructive health maintenance programs and aid companies in dealing with problems of employee health. It serves as the official accrediting agency for industrial health services to those meeting standards set by the Industrial Medical Association. It is guided by a Board of Directors representative of management and the medical profession. Industrial physicians serve as Regional Consultants, and there are a Board of Industrial Advisers, and Advisory Committees of Industrial Nurses and Industrial Hygienists. FRANK A. CALDERONE, M.D., is the Institute's President. The members of the Advisory Committee of Industrial Nurses are MARY DELEHANTY, R.N., Equitable Life Assurance Society, New York; MARGARET W. LUCAL, R.N., Ohio Rubber Company, Division of Eagle Picher Company, Willoughby, Ohio; GERTRUDE A. STEWART, R.N., International Business Machines Corporation, Washington, D.C.; and SARA P. WAGNER, R.N., Standard Oil Company (New Jersey), New York City.

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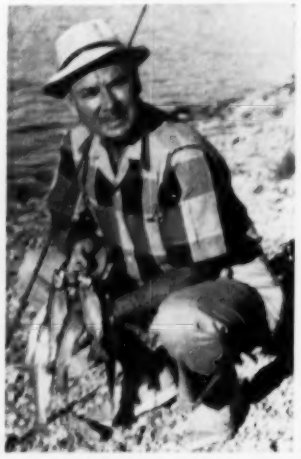


Who could write a President's Page when the mountain trout are biting like this? Kieffer Davis took time off from IMA presidential duties to spend a vacation with his family at a ranch located in a picturesque spot in the Rocky Mts.

NEW YORK Academy of Medicine is holding its 28th Annual Graduate Fortnight, October 10-21, 1955. The Program, arranged by the Committee on Medical Education, is devoted to "Problems of Aging."

INSTITUTE of Industrial Health of the University of Cincinnati will present a course of instruction in Occupational Skin Problems during the week of October 10-14, under the sponsorship of the Department of Preventive Medicine and Industrial Health and the Department of Dermatology and Syphilology of the University of Cincinnati, and the Occupational Health Program of the U.S. Public Health Service. The course will afford physicians a greater understanding of cutaneous problems of occupational origin. Physicians interested in attending may apply to Secretary, Institute of Industrial Health, Kettering Laboratory, Cincinnati 19, Ohio.

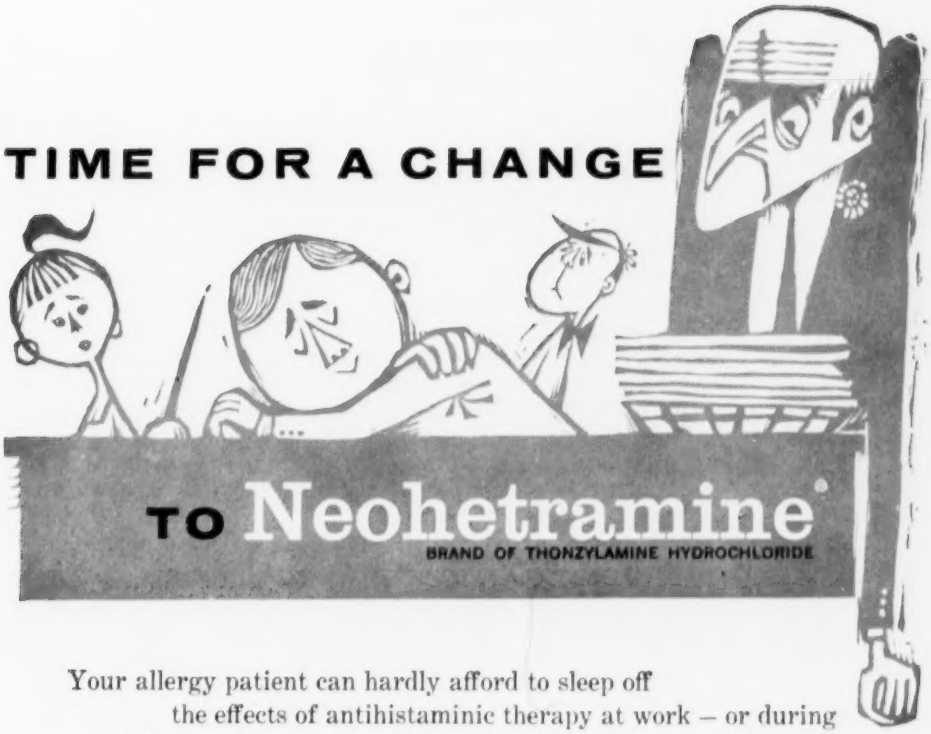
EFFECTIVE utilization of the disabled employee in industry will be the subject of the opening meeting of the Occupational Health Nursing Section at the 43rd National Safety Congress and Exposition in Chicago, October 17-21. The nursing sessions will be held in the Conrad Hilton Hotel October 18-20. Participants on Tuesday will be BEN L. BOYNTON, M.D., Medical Director, Rehabilitation Institute of Chicago; V. G. URSE, M.D., Superintendent of Psychiatry, Cook County Hospital; BEN H. GRAY, Director, National Epilepsy League; GEORGE BARR, President, George Barr & Company; RALPH E. DOLKART, M.D., Assistant Professor of Medicine, Northwestern University, and Attending Physician, Passavant Memorial Hospital; and HOWARD A. LINDBERG, M.D., Medical Director, Peoples Gas Light & Coke Company. Wednesday morning, October 19, there will be talks by J. F. MCCAHAN, M.D., Division Medical Director, Loss Prevention Department, Liberty Mutual Insurance Company, and EUGENE L. WALSH, M.D., Medical Director, International Harvester Company. DR. MCCAHAN will speak on the guiding principles and procedures for occupational health nursing; DR. WALSH on the nursing and health aspects of radiation in industry. Following the Thursday luncheon, the nurses will hear W. A. EGGERT, Ph.D., Chief Psychologist, Lumbermens Mutual Casualty Company, on "The Industrial Team—Nurse, Physician, Hygienist, and Psychologist."

Pioneer

SERVICES were planned for DR. ANNA M. GARNIER, 85, of 523 West 121st Street, a pioneer in industrial medicine who was Plant Physician and Surgeon for the American Manufacturing Company, Greenpoint, Brooklyn, for more than 20 years. DR. GARNIER died August 9 in Evergreen Convalescent Home, Yonkers, New York. She retired from her medical practice in 1922. She practiced in Gerbervillier, France, from 1917 to 1919. She was graduated from New York Infirmary for Women and Children in 1893 and opened an office in New York.

—New York World-Telegram & Sun, August 10, 1955.

TIME FOR A CHANGE



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Neohetramine is particularly useful in pediatric practice because of its markedly lower incidence of side reactions.

Dosage: Initiate with 50 mg. tablets or syrup, two to four times daily for adults, 25 mg. two to four times daily for children, and increase according to individual response.

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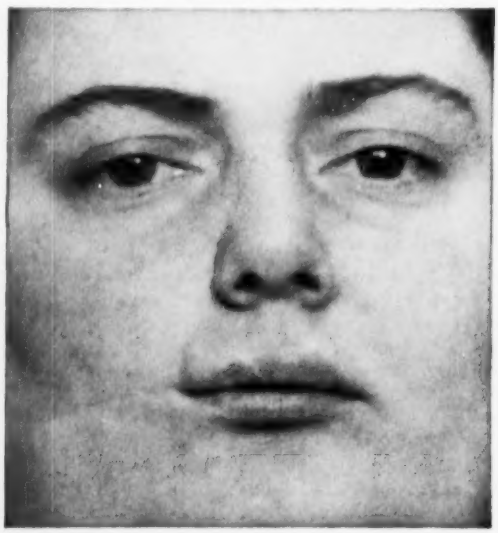
*Straith, C. L., and Straith, R. E., Detroit, Michigan: Postgrad. Med. *14*:165, Sept., 1953.



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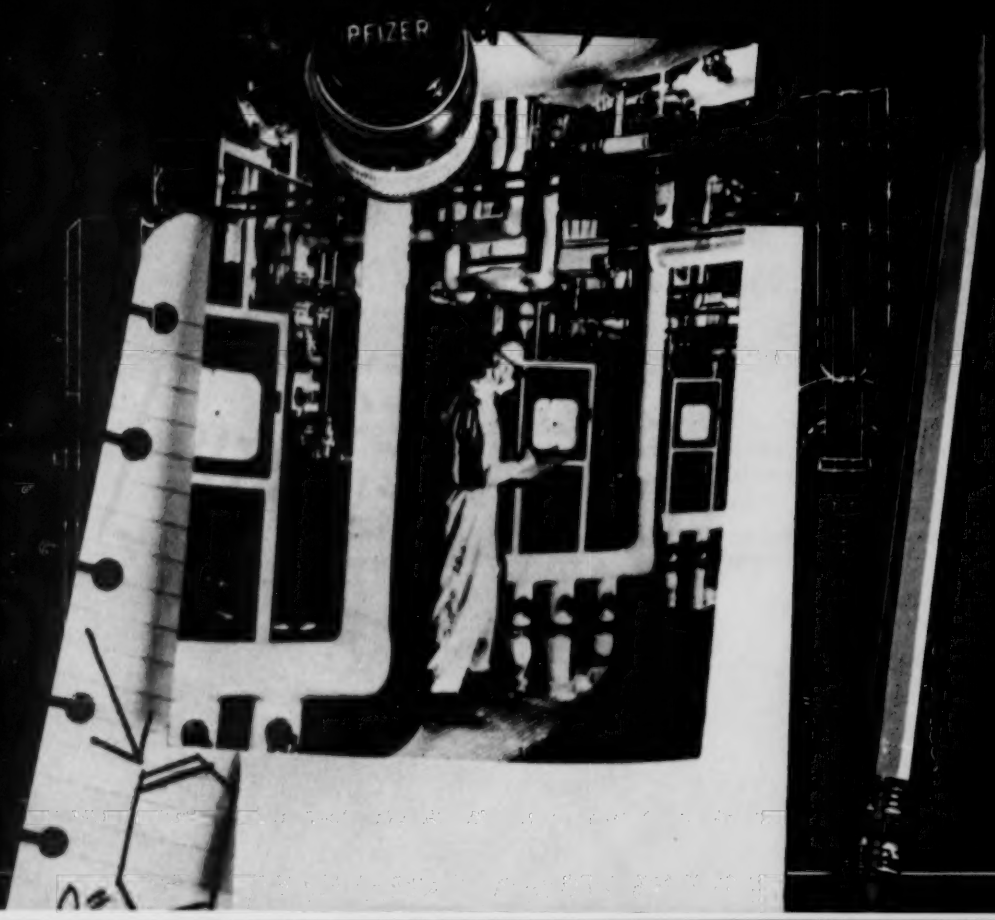

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3 to 5 times more potent than cortisone or hydrocortisone

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virtually without edema caused by sodium and water retention—avoids excessive potassium loss—other side reactions usually minor and frequently transient

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1. Boland, E. W.: California Med. 82:65, 1955; 2. Norred, S. R.: Am. Prof. Pharm. 21:241, 1955; 3. Wayne, H.: Bull. Rheumat. Dis. 5:81, 1955; [illegible]; 6. Spies, T. D.: GP [illegible]

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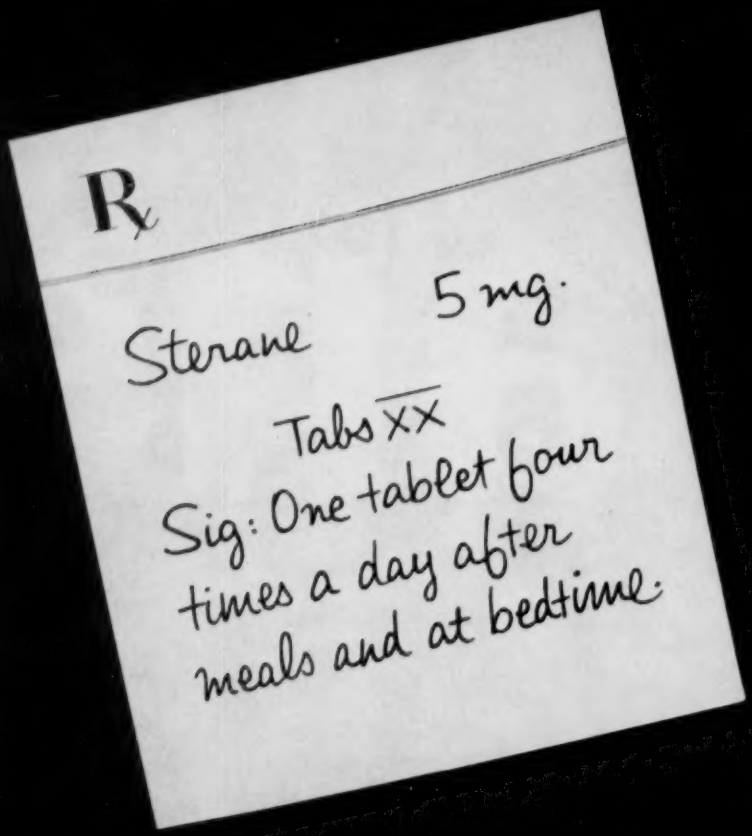

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Cortef* for inflammation, neomycin for infection:

Neo-Cortef** *ointment*

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Supplied:
0.5% (5 mg. Cortef acetate per gram)
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All 3 strengths in 5 Gm. and 20 Gm. tubes

Each gram contains:

Hydrocortisone acetate	5 mg.
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Neomycin sulfate (equiv. to 3.5 mg. neomycin base)	5 mg.
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Butyl-p-hydroxybenzoate	1.8 mg.

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1.5% (15 mg. Cortef acetate per gram)
In 1 drachm applicator tubes

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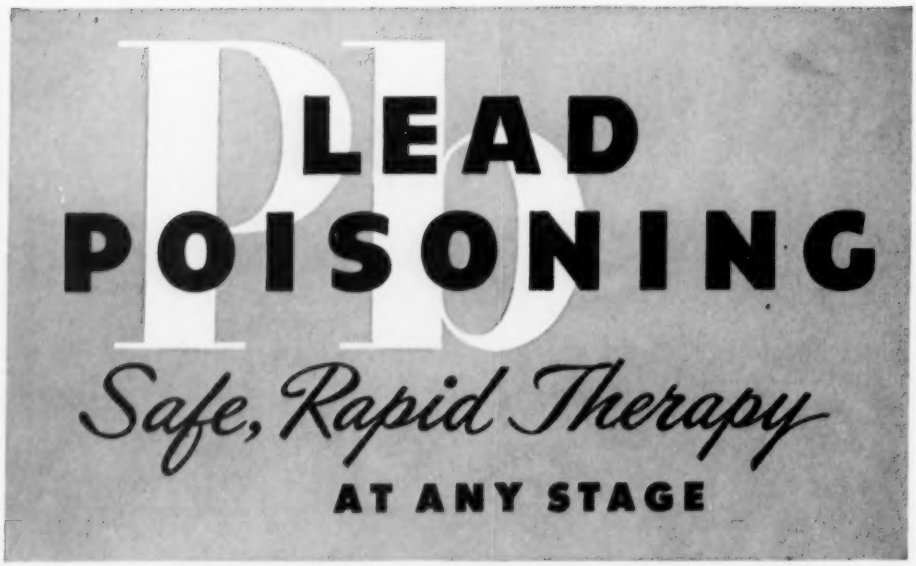

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TRADITIONAL methods of treating lead and other heavy metal intoxications are fraught with certain dangers. When heavy metals, particularly lead, are mobilized in the body by methods such as low calcium diet, administration of acids and salts, BAL and similar modes of treatment, damage to the brain, peripheral nerves, and blood-forming organs sometimes occurs from the resulting plumbemia.

In Calcium Disodium VERSENATE, the physician for the first time has a drug which is dependably effective in removing heavy metals from the body *without danger of organ damage.* Heavy metals combine with it to form a nondissociated, water-soluble, intact complex molecule, in which the metal exists in an un-ionized state. This complex is nontoxic to adults and children alike, and is excreted intact.[1]

Patients with acute lead poisoning can now safely be rendered asymptomatic in as little as 5 days.[2,3,4]

1. Rubin, M.: Biological Action of Versene, from Symposium on Complexing Agents, presented at the University of Chicago, Feb. 22, 1951.
2. Sidbury, J. B., Jr., Bynum, J. C., and Feltz, L. L.: Effect of Chelating Agent on Urinary Lead Excretion, Comparison of Oral and Intravenous Administration, Proc. Soc. Exper. Biol. & Med. 82:276 (Feb.) 1953.
3. Cotter, L. H.: Treatment of Lead Poisoning by Chelation, J.A.M.A. 155:908 (July 3) 1954.
4. Bradley, J. E., and Powell, A. M., Jr.: Oral Calcium EDTA in Lead Intoxication of Children, J. Pediat. 45:297 (Sept.) 1954.

INTRAVENOUS

Indicated to reduce blood and soft tissue lead in acute or chronic lead poisoning, lead encephalopathy, and as prophylaxis against symptomatic exacerbations in chronic lead poisoning.

Complete instructions for dilution and administration for adults and children accompany the ampuls. Available in boxes of six 5 cc. ampuls, each containing 1 gm.

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The average adult dose is 8 tablets (4 gm.) per day, in divided doses. Supplied in bottles of 250 tablets, each containing 500 mg.

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Cortisone Acetate	2.5 mg.
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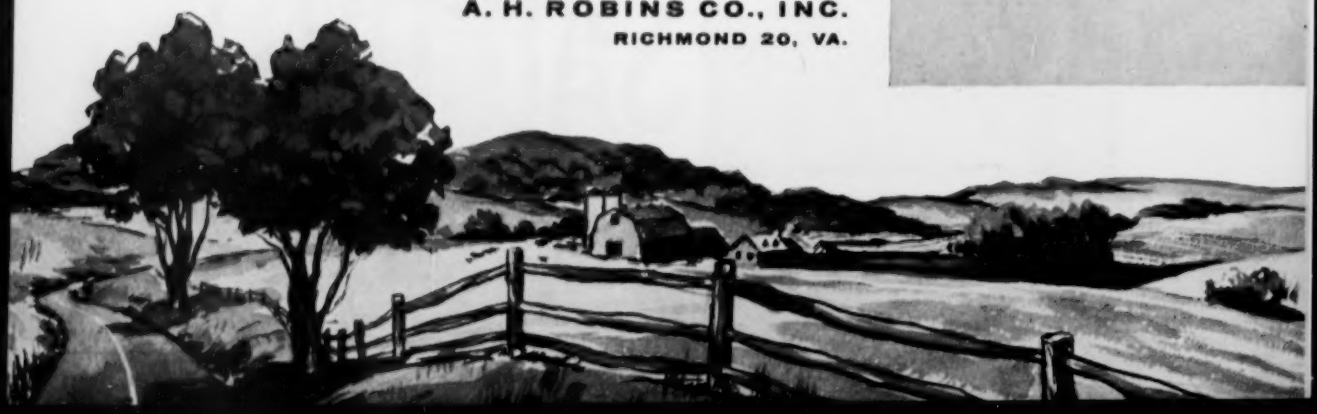

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(*Phenobarbital Extended Action Tablets*)

For Mood or
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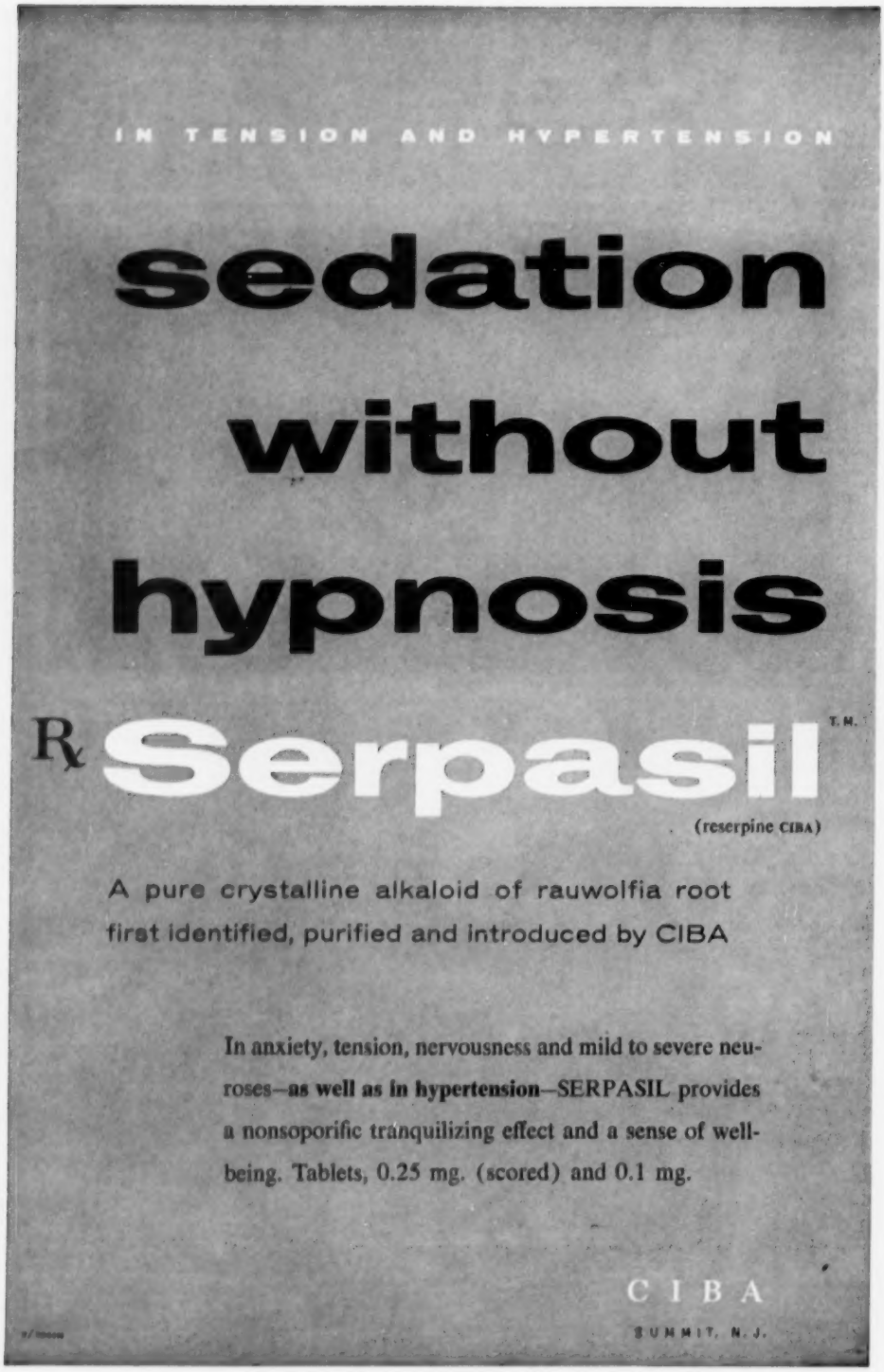
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Terramycin† SF* is a similar combination; the average daily dose (1 Gm.) of Tetracyn or Terramycin supplies the needed amount of a special vitamin formula recommended by Pollack and Halpern[4] for nutritional therapy of patients under physiological stress.

Supplied: TETRACYN SF, **Capsules** 250 mg.; **Oral Suspension** (fruit flavored) 125 mg./5 cc. teaspoonful.
TERRAMYCIN SF, **Capsules** 250 mg.

1. Dumas, K. J.; Carlozzi, M., and Wright, W. A.: Antibiotic Med. 1:296 (May) 1955. 2. Prigot, A.: Ann. New York Acad. Sc., in press. 3. Milberg, M. B., and Michael, M., Jr.: Ibid. 4. Pollack, H., and Halpern, S. L.: Therapeutic Nutrition, Prepared in Collaboration with the Committee on Therapeutic Nutrition, Food and Nutrition Board, National Research Council, Washington, D. C., 1952.

*Trademark for Pfizer brand of antibiotics with vitamins.
†Brand of oxytetracycline

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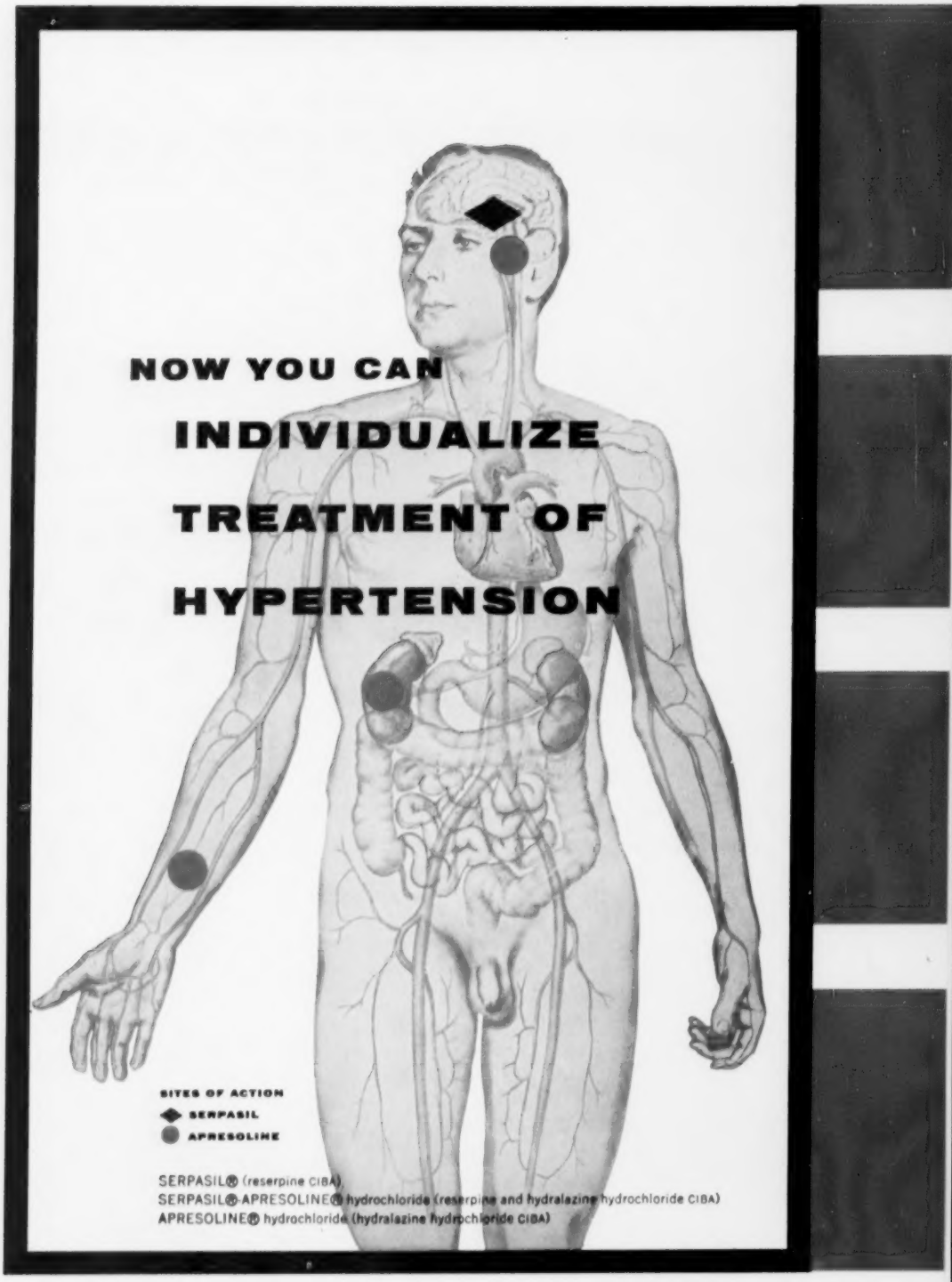
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For initial therapy—in all cases:

SERPASIL, a pure crystalline alkaloid of rauwolfia root—particularly effective in the neurogenic forms of hypertension. *Acts centrally*—tranquilizes, moderately lowers blood pressure, slows heart rate.

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In more refractory cases requiring further individualization of dosage:

APRESOLINE *acts centrally and peripherally* for a marked antihypertensive effect. Increases renal plasma flow—produces vasodilatation—inhibits pressor substances.

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Serpasil	Tablets, 0.1 mg., 0.25 mg. and 1.0 mg. Parenteral Solution (for neuropsychiatric use only), 2.5 mg. per ml., in 2-ml. ampuls. Elixir, 0.2 mg. per 4-ml. teaspoonful.
Serpasil-Apresoline	Tablets, each containing 0.1 mg. of Serpasil and 25 mg. of Apresoline. Tablets, each containing 0.2 mg. of Serpasil and 50 mg. of Apresoline.
Apresoline	Tablets, 10 mg., 25 mg., 50 mg. and 100 mg. Ampuls, 1 ml., 20 mg. per ml.

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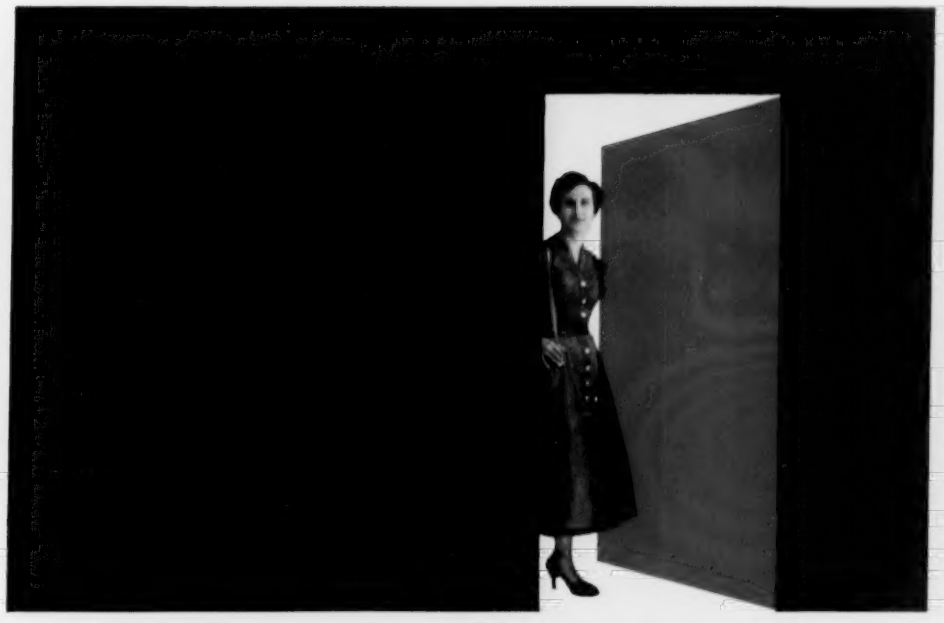

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Manganese (from Manganous Sulfate)	1 mg.
Magnesium (from Magnesium Sulfate)	6 mg.
Molybdenum (from Sodium Molybdate)	0.2 mg.
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Vitamin A (Palmitate)	5,000 U.S.P. Units
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1. Food and Nutr. News, vol. 25, p. 3 (1954).
2. McLester, J. S. and Darby, W. J.: Nutrition and diet in health and disease. W. B. Saunders Company, Philadelphia, 1952. p. 107.

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Breck Hand Cleaner is an efficient, heavy-duty cleaner which is non irritating and contains no abrasive materials. Breck Hand Cleaner cleans without lathering, and because of its mild yet thorough cleaning action aids in the prevention of skin irritation. About a teaspoonful of Breck Hand Cleaner is applied, without water, to the hands and arms and rubbed in well, followed by thorough rinsing. The excellent penetrating action of Breck Hand Cleaner loosens dirt, grime, and other soils and permits their easy removal in the rinse. Breck Hand Cleaner is formulated to rinse equally well in both hard and soft water. Breck Hand Cleaner has been found especially useful in helping to remove oil, grease, dirt, dust, grime, paint and other soils from the skin.

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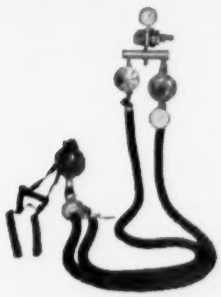

M·S·A DEMAND PNEOPHORE

This versatile instrument combines automatic intermittent positive pressure, and flow without pressure, when desired. Ideal for treatment of apnea and other respiratory emergencies. Write for details.

M·S·A PULMONARY VENTILATOR

Effective intermittent positive pressure application of aerosols such as bronchodilators and bacterio-static agents. Provides complete respiratory tract distribution. Write for details.

M·S·A OXYGEN THERAPY UNIT

Supplies oxygen on inspiratory demand to patients with voluntary respiration. Fits any oxygen cylinder or piped system. Write for details.

PUSH BUTTON FLOW REGULATOR—

Optional Equipment

Used with the Pulmonary Ventilator, depression of push button initiates flow and consequent pressure builds up, insufflating patient's lungs to preset pressure—then automatically cycles for expiration. Artificial respiration is thus provided. With other units, push button initiates flow from demand valve, and can be locked to provide constant flow rate.

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Self-contained automatic artificial respiration device that supplies oxygen under intermittent positive pressure to victims of apnea. Operation is completely automatic and safe. Lungs are inflated to predetermined pressure. Cut-off permits exhalation by natural recoil of chest and diaphragm. Facepieces for adults and children. Unit is protected by rugged carrying case. Write for details.

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At your service—84 Branch Offices in the United States and Canada

'Seconal Sodium'

(SECOBARBITAL SODIUM, LILLY)

a barbiturate of rapid action . . . short duration

When simple insomnia is the presenting complaint, a bedtime dose of 'Seconal Sodium' is often indicated. Its hypnotic effect is prompt—within fifteen to thirty minutes; relaxation and sleep follow quickly. Your patient awakens refreshed and well rested.

Available in 1/2, 3/4, and 1 1/2-grain pulvules.

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INDUSTRIAL MEDICINE AND SURGERY

SEPTEMBER, 1955

Occupational Health on Wheels

PERIODIC PHYSICAL EXAMINATIONS IN MOBILE UNITS

IN MOST sizable industrial establishments, and in many small ones, preplacement physical examinations are routine. The customary type of examination constitutes no real physical appraisal, and not necessarily should it. This limited examination is designed to determine employability but foremostly, to influence suitable job placement. It may be doubted that the term "physical examination" is appropriate, and some better term revealing the incompleteness of the audit should be created. Particularly this is true since the examinees may acquire an unwarranted conclusion as to total health when such does not exist.

By many industrial physicians, the extensive periodic examination is regarded as an essence in a good industrial medical program. While periodic physical examinations are seldom lowly esteemed in the Medical Department's program, actually few organizations carry out such activities on the entire work force and ordinarily these examinations are on a haphazard basis except in outstandingly susceptible occupations such as the lead industry, food handling, etc. A further exception in some organizations relates to executives. In most situations, periodic physical examinations are wholly on an unsolicited, voluntary basis. Apart from suspected disease states, the routine physical examinations on healthy individuals at whatever interval, such as one, two or five years, are often thoroughly lacking in scope.

The reasons for this are manifold. Even in larger industrial Medical Departments, the routine work is so exacting and the physical fa-

Fig. 1.
Medical headquarters for Occupational Health Services, headquarters for executive examinations, and consultation reviewing center for field examinations.

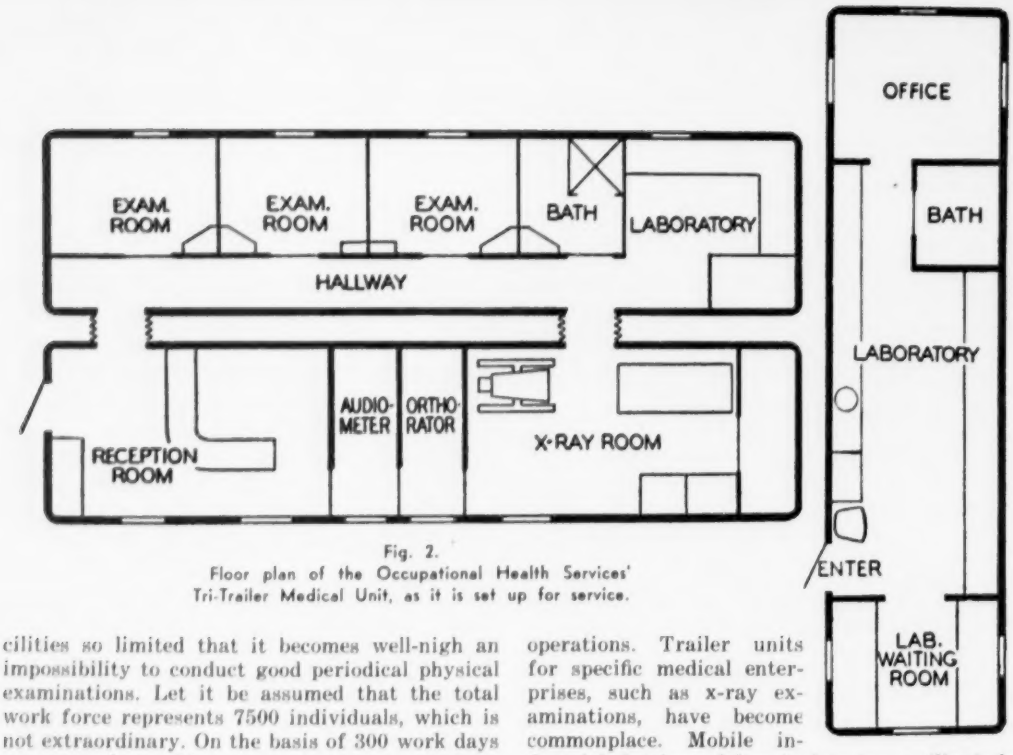


Fig. 2.
Floor plan of the Occupational Health Services' Tri-Trailer Medical Unit, as it is set up for service.

cilities so limited that it becomes well-nigh an impossibility to conduct good periodical physical examinations. Let it be assumed that the total work force represents 7500 individuals, which is not extraordinary. On the basis of 300 work days per year, it would prove necessary to conduct, apart from routine work, 25 physical examinations daily. This requirement would wreck the orderliness of most programs, at least in the absence of substantially increased medical personnel and appurtenances.

Always according high values to real periodic physical examinations of the apparently healthy worker, many plans for them have been contemplated but so far only exceptionally has it proved practical, consistently, to carry out this objective in a well devised medical program. Even though the interval between periodic audits be fixed at five years, but always having in mind that in the presence of suspected disease other appropriate examinations will have been performed, still many difficulties attend. This matter of elaborate physical examinations continually is vexatious.

At least one industrial medical organization has sought to overcome these dilemmas by services supplemental to the regular medical program through added facilities located in mobile units which move far and near to the needful place and there conduct on the premises well devised periodic examinations at whatever interval may be required by the industry, with the cooperation of its own Medical Department, without disruption of the routine program.

It is known that both in this country and abroad some industries are so far-flung in small operations that it has proved necessary to organize medical facilities within mobile units and to move from post to post for routine medical services as well as physical examinations as exigencies demand. This situation sometimes confronts the petroleum industry, and it is believed that at least two such corporations in this country now rely upon the medical services built around mobile units for their smaller and remoter operations. Trailer units for specific medical enterprises, such as x-ray examinations, have become commonplace. Mobile industrial hygiene laboratories are utilized by many state departments of health. Now comes the description of how the medical needs of small plants the country over are met in some degree by taking the necessary medical equipment to them. Manifestly these operations often are not justified in the maintenance by these small plants of personnel and equipment on their own premises.

The Facilities

OCCUPATIONAL HEALTH SERVICES, with headquarters in Asheville, North Carolina, and under the direction of Dr. Logan T. Robertson, conducts divers activities in the field of occupational health which are both independent and correlative. Three undertakings are well established. A fourth is in development stages. All are now mentioned, but present interest centers about only one.

1. In the Asheville community total industrial health services are provided a number of small plants in proportion to need. This enterprise, which is of high character, is not unlike similar undertakings in many places.

2. Medical services on a nationwide basis are provided in terms of physical examinations for executives. This portion of the work is not dissimilar to that offered by numerous other physicians, services and hospitals. However, two departures stand out. The first of these is that a blanket charge of $150 is made, even though many more than the scheduled procedures may be performed. It is notable that the basic examination extended closely follows that later to be described in mass examinations for workers at a distinctly lower cost. Justification exists in that Occupational Health Services is closely identified with a group of medical consultants housed in one build-

Fig. 3.
The front of the clinical mobile units presenting some service connections with the plant, such as water and power. Also forward passageway connecting units. Laboratory unit in background.

ing near to Occupational Health Services' headquarters and all executive examinations have personal consultation with some six or more consultants, while in the case of mass examinations, consultation by this same group is limited to record scrutiny. The second uncommon feature of executive physical examinations is that Occupational Health Services operates in closeness with an outstanding hostelry where all examinees may be housed and where any requirement as to special diet or test meals may be furnished as routine on prescription.

3. The near unique development by Occupational Health Services is a program of periodic physical examinations conducted anywhere in the country on the premises of industry through the facilities of mobile units as supplemental to industrial medical programs already established. This third item is the objective of the description soon to follow.

4. In its formative period is a fourth venture directed to services solely in the organization of industrial Medical Departments. It is well recognized that many industries desiring to develop medical programs and to provide facilities are at a loss as to how to go about this step. It is known that numerous expensive errors have been made. This prospective activity contemplates the complete planning of industrial medical services suitable to any particular industrial establishment—to provide suitable architectural and engineering layouts, medical equipment, programs, record systems and, on occasion, personnel, and to engage in the training of personnel when required.

Fig. 6.
The detachable power units are removed on location.

On the completion of organizational measures, Occupational Health Services proposes to stand aside beyond the point of possible continuing consultative guidance. This activity is all future.

Apart from the foregoing, it is observed that Occupational Health Services maintains perhaps the most elaborate assemblage of business machine and mechanical secretarial devices anywhere devoted to occupational health pursuits.

All further portions of this present description

Fig. 4.
Reception center—mobile units.

Fig. 5.
X-ray exposure room—mobile units.

are limited to the third item, namely, the mobile unit services in the conduct of mass physical examinations.

The physical equipment—trailers and their content of medical appliances and the arrangement thereof—is presented through floor plans and photographs. Three trailer units are provided. Two of these, of aluminum structure, are

especially designed for the purpose and are custom built. The third unit is a remodeled house trailer in which are contained all laboratory processes. Apart from the detachable motor units, the over-all length of the two clinical trailers is 35 feet each, with a width of approximately 8 feet each. The structure of the two clinical units is such that, when stationed, two passageways are provided substantially leading to a single compact unit with the appearance of the well-equipped office of any physician. The laboratory unit is located close by the other two but without interior communication.

When at the location for prospective work, electricity, water supplies and telephones are obtained through temporary connections with the plant. All units are air conditioned. For winter months heating facilities are self contained within the units. While the two clinical units appear to be massive, the total weight falls within the allowable limits for all states.

The physical appurtenances in themselves should not and do not determine the rate of examination or the total daily number thereof. That is governed by the medical program and the desirability of privacy. Fulfilling these requirements these facilities, as portrayed and described, permit a flow of work of some 40 to 60 examinations during an eight-hour shift. Accumulated experience favors the rate of flow of work at 40 per shift. It now becomes computable that at that rate of examination and operating on only one shift daily, for a plant requiring 1000 examinations, a figure chosen at random, these units would be on location for 25 work days. At the top rate of work flow (60 per day) 16 work days would be required. Emphasis as to these figures is not upon the long-time requirements but instead upon the thoroughness of the examination.

The Program

OBVIOUSLY, some flexibility in the program is requisite. Beyond debate, if Occupational Health Services were called upon for physical examinations in a storage battery plant, for example, the work program would embrace features such as porphyrin tests, blood and urine lead examinations, etc., that would not be included in the schedule for the employees of a rayon mill. Consequently, a basic work program has been constituted with some modification as to male and female and to certain age groups to which are appended supplemental measures as circumstances dictate. The items in the basic program now appear:

- Family medical history.
- Personal medical history:
  - Operations.
  - Past illnesses.
  - Immunizations.
  - Education.
  - Employment record and present and past work exposures.
  - Drug, alcohol, and smoking habits.
  - Present complaints.
  - Height, weight, plus "body build."
  - Skin fold measurement (direct measurement adipose tissue).
- Audiogram (Maico).
- Orthorater test.
- Blood pressure (above 150/90 considered abnormal).
- Chest x-ray—4 x 5 films taken routinely, 14 x 17 if patient is obese or if ordered by examining physician or reviewing radiologist.
- Electrocardiogram—Leads I, II, III, Avr, Avl, Avf: and chest leads I, IV, and VI. Routine procedure for patients age 40 and over, and also done at request of examining physician, or at special request of patient.
- Tonometry.
- Examination by Internist—Ears, eyes, fundi, nose, teeth, throat, neck, chest, heart, abdomen, hernia, external genitalia, rectal examination, pelvic examination (including Papanicolaou stain) and extremities.
- Laboratory Procedures:
  - Blood sugar (Somoygi-Nelson method)—Given 75 gm. glucose and blood is drawn one hour later. Glucose tolerance done routinely if blood sugar reading is above 180 mgm.%.
  - Hematocrit.
  - Buffy layer, W.B.C. if abnormal.
  - Serology—VDRL (Positives reconfirmed by Kline).
  - Blood type.
  - Rh. factor classification.
  - Icterus index.
  - Clinitest (urine sugar).
  - Bumintest (urine albumin).
  - Ictotest.

If it may be assumed that this basic program is conducted without exceptions—and there is no reason to believe that such is not the case—and likewise that the program continually is being enlarged, it follows that these steps far exceed the customary routine physical examinations of the apparently healthy worker.

The Practices

ONE of the desired ends connected with these physical examinations as conducted by Occupational Health Services is to merit the support, cooperation and participation of local physicians. The medical profession is a scientific group, jealous and zealous of its local practices, prices, procedures and customs. The advent of unusual portable medical appurtenances from some other state could lead to unfavorable criticism from the medical profession, as individuals or associations, unless carefully the entire project is laid before the profession. Accordingly, past experience and sound judgment have dictated a number of procedures favorable to the most successful operation. Proper relationships involve not only physicians but also workers, management, and other groups. Most desirable are, and should be, efforts not to disrupt proper private physician-patient relations. The acid test as to the justifi-

cation for the performance of medical services in a community by an outside medical agency is whether locally the same services may be provided on the premises, of the same scientific caliber, in the same space of time, without upsetting the normal industrial medical routine. If this is true, there is no occasion for these supplemental services by an outside agency. If this is not true, warrant does obtain, and there should be the support and collaboration of local medical groups.

Some of the measures in this direction are now mentioned:

1. Prior to the inauguration of any work and prior to the arrival of the mobile units, the officers of the local medical society are apprised of the enterprise, its nature, methods and objectives. Advice and guidance are solicited. In some instances, individual letters from the society itself have been sent to every member of the medical society. Since local medical societies sometimes may be concerned as to the attitude of national medical bodies, the practices, procedures, programs and forms of Occupational Health Services in connection with mobile unit examinations have been laid before divers national groups. So far as ascertainable, no condemnation has arisen in any respect but always within the proviso of the acid test above mentioned.

2. All examinations customarily conducted by physicians are conducted by local physicians within the mobile units, and they are paid for their services. Other measures such as laboratory work are conducted by Occupational Health Service's own personnel.

3. In view of the necessary follow-up work it has proved impractical to proffer the mobile unit services to any plant not already having a physician on its staff.

4. Examinations are limited to volunteers, there being no coercion in any respect, but past performance indicates a percentage of volunteers in excess of 90%.

5. Where unions exist in industry the union officials are well informed as to the project, and full support is sought.

6. Other preliminary discussions are necessary with management and foreman groups, to the disclosure that all procedures are voluntary, that management will be furnished no individual's report, and that management information will be limited to summaries and statistics, with no mention of the names of any individual.

7. In this mass enterprise the obvious danger is that proper human relations may not be preserved. This danger is unwanted and avoided. As earlier noted, the same privacy is obtained within the rooms of the mobile units as is obtained in a physician's private office, and generally the procedures are not dissimilar to those in a private office except that little or no time is spent in waiting.

8. No treatment whatever is carried out, and no opportunity for same is sought.

9. Arrangements are made with every examinee that a letter be furnished him setting forth in general terms the need for corrections of defects and diseases encountered, or otherwise that no abnormalities were detected. The examinee is urged to seek amelioration through any physician of his choice, or at least to consult with his physician.

10. Likewise, permission is sought from every examinee to send to the physician of his choice extensive information growing out of the examination. The letters to physicians necessarily are not complete as to detail but the physician is invited to call upon Occupational Health Services promptly or at any later time to furnish additional information, including copies of the entire examination record with x-rays.

11. Management is furnished only summarized records but in elaborate form.

12. After examination, all records are reviewed by the consultants to Occupational Health Services in their home offices. Group consultations are arranged as indicated. All of the letters mentioned are prepared only after home office medical scrutiny.

A number of specimen letters are included here, further revealing customary practices in relation to examinees, private practitioners, etc.

"Dr. John Doakes,
42 Meridian,
Midtown, Ohio.
Dear Dr. Doakes:

One or more of the employees of XYZ Company gave your name as family physician when they participated in a health inventory examination offered by management.

The employees participate in this program on a voluntary basis, and are offered a rather complete screening examination, the results of which are entirely confidential. They receive a personal letter telling them, in lay language, of the findings, a copy of which will be forwarded to you, their family physician. You will also receive technical reports on any significant abnormalities. The patients will be urged to check with you for advice and treatment.

The XYZ Company is making this investment in the hope that many of the serious or potentially serious health abnormalities may, through early detection, receive proper medical attention. Obviously, a healthy group of employees would be of tremendous value to them.

For your information, I shall enclose a list of the routine procedures included. The actual physical examinations were performed by local internists on mobile equipment furnished by us. The electrocardiographs, chest films and other laboratory data are interpreted by Board men in the various specialties.

All the data are put onto IBM punch cards, so that if you are particularly interested in any statistics we would be more than happy to cooperate with you. Also, the EKG's, the chest films, and so on, are all filed permanently, so if you have any need for them in the future, we will gladly forward them to you.

If you would care to know more about the program or have any suggestions, please do not hesitate to drop me a line.

Sincerely

_____"

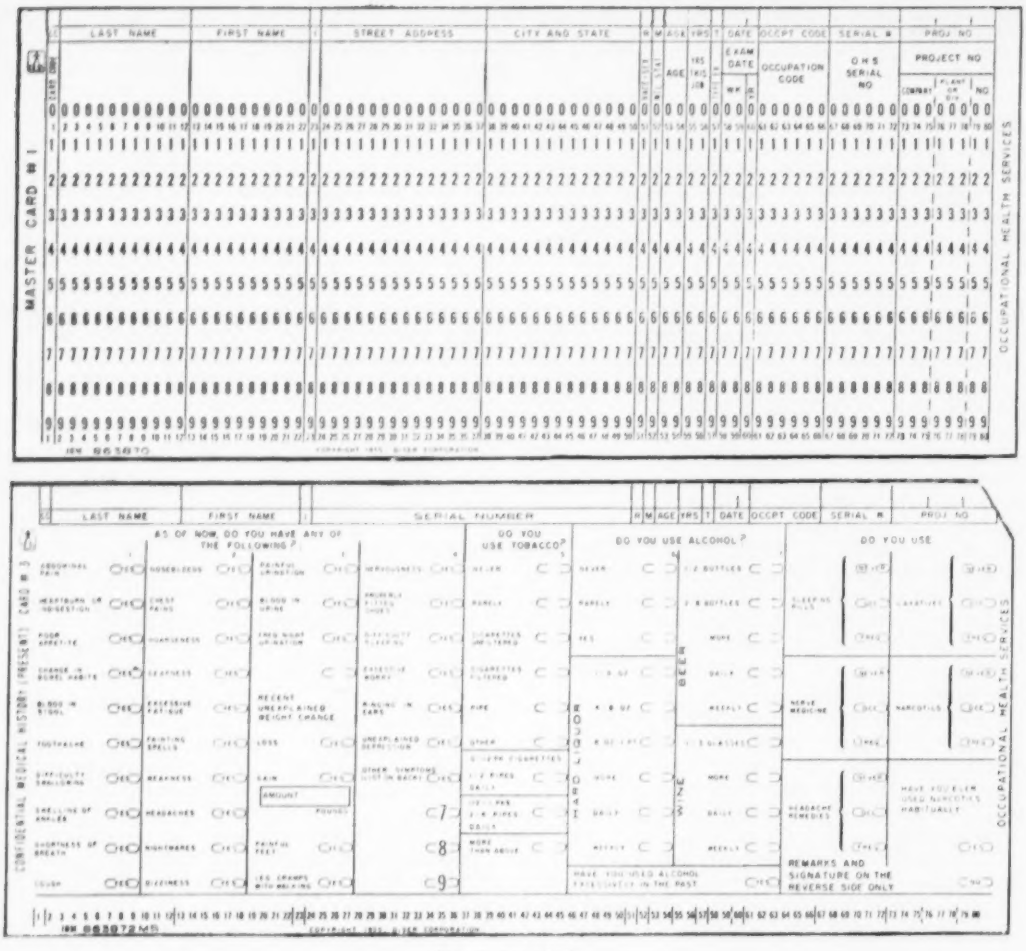


Fig. 7 A and 8.
Specimen codification card; from a total of 13 routinely employed.

"Mr. George Smith,
842 Millview Drive,
Midtown, Ohio.
Dear Mr. Smith:

We should like to give you the results of your recent examination performed on the mobile medical units.

Of utmost importance was the finding of an elevation of your blood sugar. This was confirmed by the performance of a glucose tolerance test. We urge you to consult with Dr. Morgan, your family physician, and follow his recommendations about this matter. We have forwarded the technical results of your examination to him as you requested.

The remainder of your procedures were satisfactory. Chest x-ray and electrocardiogram were reported as normal. Serologic test was negative, and hematocrit determination indicated the absence of anemia. Your visual performance profile revealed a slight decrease in far acuity.

Your medical information is held in confidence between you and your personal physician as you requested. A copy of this letter is being sent to the plant physician. We should like to emphasize that these examinations provided by XYZ Company were designed to detect only certain illnesses. We believe you can best protect your health by remaining under the care and observation of your personal family physician.

Cordially yours

_____"

"Dr. John Doakes,
42 Meridian,
Midtown, Ohio.
Dear Dr. Doakes:

Re: Mr. George Smith

Mr. Smith, a 67-year-old, white male, height 5′ 6½″, weight 184 lbs., had blood pressure recorded at 164/80. He denied symptoms at time of examination. The examining physician noted the liver to be enlarged two fingerbreadths below the costal margin. Chest x-ray was reported as showing evidence of calcium sclerosis of the aorta. Electrocardiogram was normal. Glucose tolerance test, after the ingestion of 100 grams of glucose, was reported as follows:

Fasting	8:10	156	4 plus
15 min.	8:25	224	4 plus
30 min.	8:40	311	4 plus
1 hour	9:10	246	3 plus
2 hours	10:10	418	3 plus
3 hours	11:10	254	4 plus

Mr. Smith has requested that this information

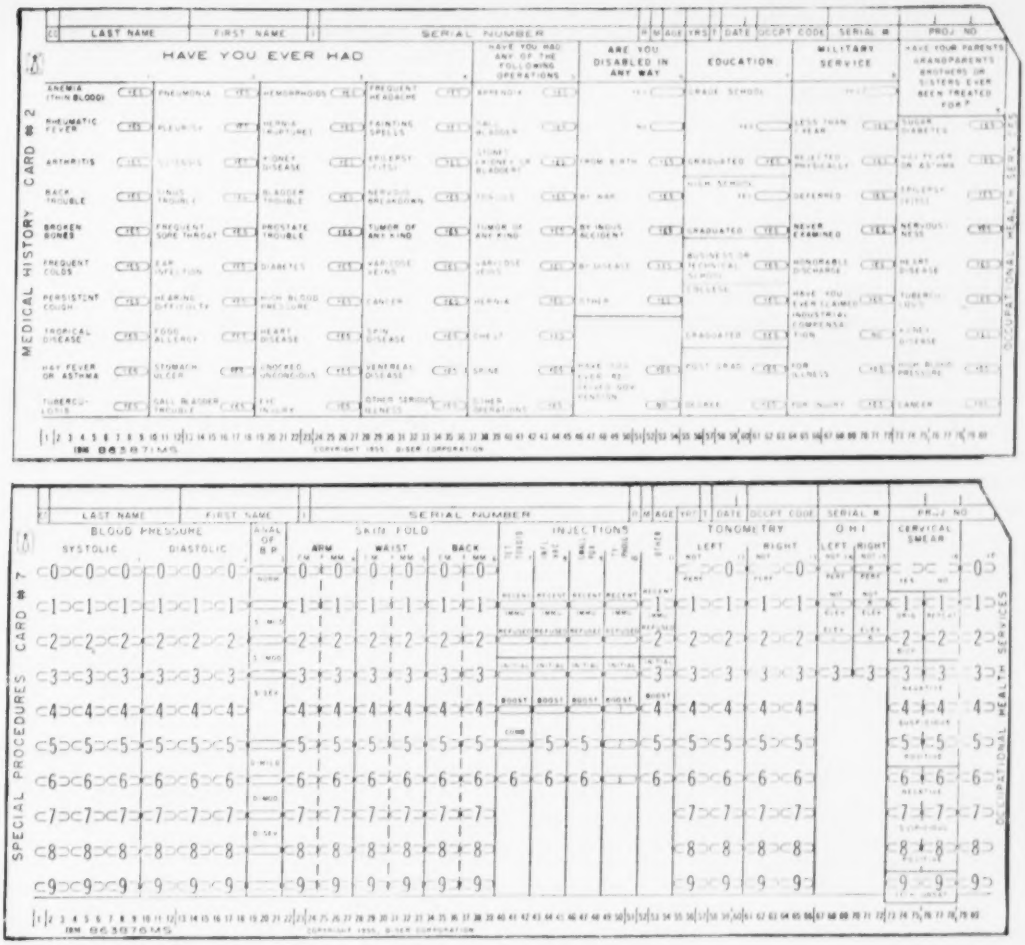


Fig. 7 C and D.
Specimen codification cards from a total of 13 routinely employed.

be furnished you. If you have any follow-up diagnostic information, we should appreciate hearing of it in order to complete our own records.

Cordially

_____"

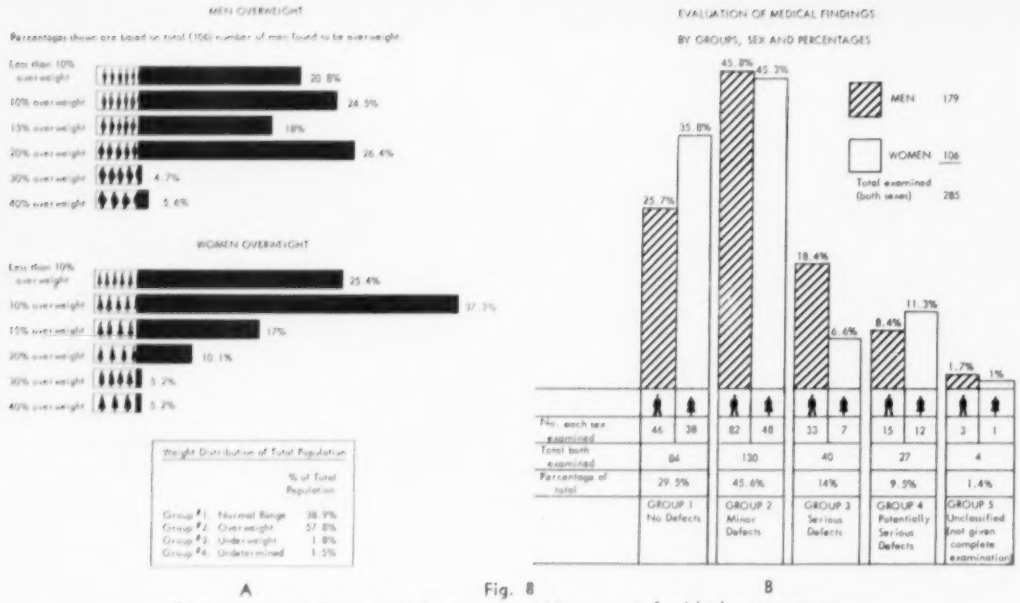
The Records and Reports

THE HEART of any good industrial medical program is the records kept and statistically analyzed. Without good records, despite superb personnel, an industrial medical service is almost reduced in value to emergency stop-gaps and "on-the-spot" counseling. It is to be expected that in the devisation of Occupational Health Services' program for mass periodic physical examination record compilation and utilization would constitute a prime feature. Such is the case. Through a combination of International Business Machine card systems, and similar card systems carefully developed for this particular undertaking, the entire matter of record keeping has been facilitated without any simplification resulting in omission of pertinent factual material. While many medical records are based upon "check-off" methods, the greater number provide no real information and particularly so as regards medical history. That such is not the case here is best demonstrated by presentation of some of the major cards utilized.

Already mention has been made of reports to examinees and to physicians. Likewise mention has been made that the only report placed in the hands of management consists of summaries and over-all appraisals. While these management reports may be extensive, the nature of items covered is exemplified by the presentation of two specimen pages picked at random, together with a specimen transmittal letter accompanying the statistical report furnished management:

"Gentlemen:

The attached report is an over-all analysis of the current health status of the employees of the XYZ Company. It is based on the results of a survey of 705 employees who received from February 4 to February 25, 1955, physical examinations by Central County physicians in the trailer-clinics of Occupational Health Services. These examinations were supplemented by chest x-rays, urinalysis, blood tests, electrocardiograms



A B

Fig. 8

Specimen pages from an elaborate summarizing report furnished management.

when indicated, and by visual and hearing tests.

To each employee a personal letter has been sent telling him, in lay terms, the results of his examination. Recommendations for corrective measures were included whenever indicated. A copy of this letter was sent to the personal physician named by an employee, as it is his personal physician who is an individual's chief source of medical advice and only source of treatment. In addition, when significant abnormalities were found in any part of an employee's examination, details of such findings were sent to his personal physician in a separate note. The personal physician of every employee has been invited to request additional information if he should so desire. The detailed records and results of the various laboratory tests will continue to be available to any physician consulted by any one of the examined employees of the XYZ Company.

The examinations performed in the trailer-clinics are designed to be supplementary to a complete in-plant medical program. An in-plant program is concerned with the day-after-day problems of the working environment and the people in it. The trailer-clinic examinations, on the other hand, are an essential reference file of reliable health information, which the plant physician and his staff may consult as an aid in performing their job more effectively. Continuing reports of a battery of examinations—pre-employment, annual or periodic, return to work after illness—will give, by providing an authoritative index of the health of the employee population, an over-all picture to management.

An adequate medical program is based on prevention. Prevention is facilitated by the individual's own awareness of critical signs. As far as was practicable, educational work was carried on along with the examinations performed in the trailer-clinics during this February 4 to February 25 period. Explanations of how serious illnesses may be avoided by prompt attention to early symptoms were made to the employees—with particular emphasis to those employees whose examinations revealed conditions that should be corrected.

In the course of the study of the diagnostic records obtained in the examinations of the employees of the XYZ Company, a fairly high percentage of medical defects needing correction was found. Many of these were not formerly known to the employee. Some were known, but had gone uncorrected. All medical defects found are matters of importance to management, as well as to the employee in question. In many cases, an employee's continuing to work when he has an uncorrected medical defect constitutes a risk to himself as well as to others. Where defects are truly serious, there is the increased probability of accident and of increased absentee rate through illness, all of which is of concern to the company.

Through subsequent periodic examination of employees, a progress report can be built up for management. These subsequent examinations can show how many of the reported defects were corrected, how many ignored, and the seriousness of those still needing correction. In addition, follow-up examinations would reveal any new medical problems that had developed in the interim.

At the close of the attached report, a more detailed addendum listing specific health problems has been included for the Medical Department of the XYZ Company; cases requiring follow-up have been itemized.

Sincerely

_____"

The Prospects as to Wider Application

FUNDAMENTAL in the ambit of the future of Occupational Health Services and thoroughly appreciated by its executive and medical heads are these questions: Is this innovation good for

(a) the worker who should be the chief beneficiary, (b) industrial medicine in general, (c) the particular industrial physician in a plant under study, (d) local physicians, (e) industry? And in their minds is the further question whether this innovation is something that may be emulated to advantage in wide application. In that connection the following considerations possess the forefront of their thought:

1. The present physical facilities constituting the trailer units and their content are in this instance so elaborate and so expensive as to appear to be uneconomical for many situations and for many physicians. The capital cost of unit and equipment approximates $100,000. It is obvious that less expensive facilities still would be practical. It may be believed that an expenditure approximating $30,000 might prove sufficient if it were contemplated to render total medical services in a single community. In this instance, a distinction is drawn between facilities for mass physical examinations and facilities for total services including some treatment, in behalf of a series of smaller plants in any one community.

2. The cost involved in the transportation of the facilities within these mobile units tends to restrict the opportunities for the services described. It would seem somewhat impractical for these mobile units to move some such distance as 1000 miles in order to carry out some small number of examinations, such as 400. A fixed charge of $2.00 per mile is made. Before a single examination had been conducted, a prospective charge of $2000 would have accrued. At a charge of $20.00 for every examination a total cost of $10,000 would be in view. (These charges may be modified depending upon the total number of examinations.) Yet, this amounts only to a per capita cost of $25 which, in view of the elaborateness of the examination, certainly is not exorbitant. It is unlikely that an equal examination on a private basis could be accomplished at any near approximation to the figure mentioned and still be financially advantageous to the medical personnel so engaged on a local basis.

If this type of service is to be duplicated widely, optimal advantages may arise if conducted on a regional basis instead of national as is now necessary because of uniqueness. Obvious advantages will accrue in the orderly development of this enterprise if several plants, large or small, in a community or in areal proximity may band together in order to promote transportation economies.

3. Apart from capital costs in connection with possible day-by-day services, a further handicap arises in that the movement of these unwieldy units is mildly akin to moving a small circus. Day-by-day services are impractical for the facilities under observation and were never contemplated.

4. The excellent physical examinations presently being made are conducted without obvious regard for the work environment. Physical examinations without the elimination of harmful exposures become less valuable. Those industrial organizations without substantial industrial hygiene activities well might be served by Occupational Health Services by a concurrent exploration of industrial hygienic needs.

5. While a full measure of earnest effort is expended toward rapport with the practicing physicians and consultants in a community, it might prove advantageous to utilize the services of local laboratory personnel when available, within the unit laboratory, just as local physicians are brought into the clinical procedures.

6. Greater values from these mobile services will arise if not just one round of examinations be made but instead effort be directed toward arrangement for repeat examinations at one, two or five years. By so doing, follow-up work might prove far more significant than from one round of examinations with total disappearance thereafter.

Summary

AN INNOVATION in the facilities for the furnishing of periodic physical examination in industry has been portrayed. This new departure centers about the provision of services through mobile units traveling to employment premises. The program, the practices, and the facilities are described, and the scope and direction of the medical and economic future of the enterprise are indicated.

The Nightmare of the "Manipulative Society"

A WORLD of unseen dictatorship is conceivable, still using the forms of democratic government, in which education has been replaced by training, in which government creates artificially the public opinion which keeps it in power, in which "loyalty" investigations corrupt the whole system of communications, in which only "safe" ideas are expressed, in which love of country is corroded by conscription and integrity is swallowed up in expediency, and in which the springs of technical, as well as of moral, progress are eventually dried up. The cleverer we are and the more we know, the more thoroughly we may damn ourselves.

—From "Religious Foundations of Economic Progress," by KENNETH E. BOULDING, in *Harvard Business Review*.

The Surgical Management of Varicose Veins on a Semi-Ambulatory Basis

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New York City

THERE IS CONSIDERABLE morbidity and work-time lost in industry each year as a direct result of the medical complications of varicose veins. Bed-rest and immobilization are usually important therapeutic measures in the management of varicose veins and their complications. If treatment could be carried out on a semi-ambulatory basis, there would be a saving of many industrial work-hours.

The investigation here described was made to determine the most effective and expeditious method of treatment for varicose veins, and it has been sponsored by the Butcher Workmen Union of Greater New York and New Jersey, Locals 640 and 342. The principles of treatment which are described in this report have been used effectively for individuals in every walk of life.

Since 1951, when the study was undertaken, 2946 patients have been screened. Of this group, there were 2029 males and 917 females. There were 144 patients with varicose veins, an incidence of 5%. In the majority of cases (58%) the varicosities were bilateral. If only one leg was involved, it was more frequently (57%) the left. The varicose veins were invariably a direct result of valvular insufficiency at the sapheno-femoral junction (Fig. 1). (Fig. 1 shows varicose veins, with unusually marked insufficiency at sapheno-femoral junction. The crux of effective treatment is a ligation of the long saphenous vein, flush with the femoral. The entire vein is then stripped out, with the aid of an intraluminal stripper.)

Fig. 1.

It has been our impression, similar to the experience of others, that a constitutional predisposition to varicose veins is the most important etiological factor. However, if susceptible individuals do heavy physical labor or if their jobs require prolonged periods of standing, these factors are undoubtedly responsible for the relatively early appearance and rapid progression of varicosities.

The patients with varicose veins were in the following age groups:

20-30	5
30-40	26
40-50	43
50-60	49
60-70	18
70-80	3

At the time of the initial examination, 17 patients had complications from their varicose veins. Two patients had phlebitis, 10 had marked brownish pigmentation (Fig. 2), two had an ulcer, and three had varicose eczema. (Fig. 2 shows varicose pigmentation secondary to marked valvular insufficiency at sapheno-femoral junction. If the venous stasis is not eliminated, further breakdown of the involved skin occurs and an ulcer develops.) The highest incidence of complications was in the 40-60 year age group. Operative treatment was not considered until all complications had cleared up. Formerly, it was common practice to treat the complications of varicose veins by means of complete bed rest. This involved a great deal of time lost from work. Practically all complications have been treated effectively by using appropriate elastic bandages during the day. If these bandages are applied properly, all venous stasis can be controlled (Fig. 3). (Fig. 3 shows a varicose ulcer: (Left) Prior to treatment: There is typical varicose pigmentation and scarring secondary to marked sapheno-femoral insufficiency. (Right) Following treatment with elastic bandages: Even though patient has been fully ambulatory, the ulcer has healed completely. Operative treatment is performed at this time.) If infection is present, antibiotics, via the parenteral route, are used. All patients have continued working while the complications were being treated.

It was formerly common practice to treat varicose veins by means of injections of sclerosing solution. This mode of treatment is unsatisfactory if there is any significant valvular insufficiency.[1,2,3,4] Every recent report concerning varicose veins has emphasized the importance of an adequate high ligation of the long saphenous vein. This implies that the saphenous vein is

Fig. 2.

Fig. 3.

ligated flush with the femoral after all of its branches in the upper thigh have been divided. Unfortunately, in a significant proportion of cases this dissection is not carried high enough. Unless the femoral vein is visualized, small branches near the sapheno-femoral junction may be overlooked, and it is these vessels that pave the way for recurrent varicosities.

Assuming that an adequate high ligation of the long saphenous vein has been performed, there still remains the problem of dealing with the residual varicose vein segments. Any one of the following types of procedure may be carried out:[5]

1. Mass retrograde injection of the distal saphenous vein segment.
2. Multiple ligations of the residual saphenous and perforator veins.
3. A complete stripping procedure.
4. Obliteration of residual varices by repeated injections of sclerosing solution after discharge from the hospital.

Satisfactory results can be achieved in many patients who have varicose veins with any of the aforementioned types of operation. This is because an essential part of all these techniques is a ligation at the sapheno-femoral junction, where the predominant insufficiency usually occurs. Patients with multiple incompetent perforator veins present a more complicated surgical problem. All of the incompetent perforator veins must be eliminated. The operative procedure of choice should include the following features:[6]

1. Elimination of all venous incompetency at its source.
2. Extirpation of all residual varicose vein segments so that few, if any, postoperative injections are required.
3. Making as few incisions as possible, so that the operating time is short and cosmetic result good.
4. Local anesthesia and mobilization of patient almost immediately postoperatively.

A procedure of this type has been used during the past four years.[7] The patient is admitted to the hospital on a Friday morning and operation is performed the same afternoon, after premedication with Demerol, 100 mg., and Nembutal, 200 mg. At operation, following a ligation of the long saphenous vein and all "blow-outs" flush with the deep venous system, the remaining varices are stripped out with the aid of an intraluminal stripper. Four incisions are usually made (Fig. 4), but additional incisions may be necessary if there are numerous "blow-outs." The thigh and leg incisions can be very short ($\frac{1}{2}$ inch) since the exact course of each vein has already been delineated by a skin marking ink. The scars that remain are practically invisible. If incompetency exists in the short saphenous system, it is also stripped out. (Fig. 4 is a diagrammatic representation of operative technique. Incisions are made in groin, mid-thigh, just below knee and just above medial malleolus. The long saphenous vein is ligated flush with the femoral. Between incisions the entire vein is then stripped out. At the site of each incision all communicating branches are ligated. Bleeding from other small branches which are torn is minimal.) The entire procedure is performed under local anesthesia. One percent novocaine, without adrenalin, is injected at the site of each incision and in the subcutaneous tissue along the entire course of each vein segment to be stripped out. The entire saphenous vein can be extirpated without causing pain. A total of approximately 125 cc. of novocaine is used. The patient is ambulatory practically immediately following operation. He is discharged from the hospital the same day or the following morning. He remains fully ambulatory while at home, and returns to work the following Monday. During the day he wears a four-inch rubber reinforced elastic bandage, from the toes to the knee, for a two-week period following operation.

It has been found that minimal inflammatory

reaction in the leg develops when the patient is ambulatory immediately following operation. This activity also minimizes any tendency toward thrombo-embolic phenomena. Postoperative treatments are reduced to a minimum since few, if any, postoperative injections of sclerosing solution are necessary. By stripping out the entire long saphenous vein, all communicating veins are severed, thus minimizing the possibility of future incompetency at these sites. One hundred and fifty stripping operations have been carried out in this fashion in the past four years.

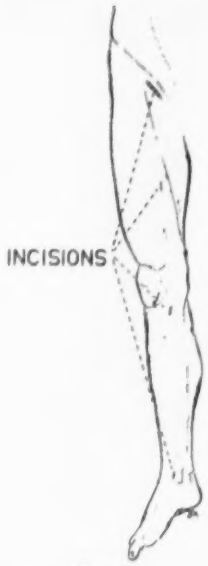

Fig. 4.

By carrying out a procedure of this type, many work-hours are saved. It has been observed that patients who return to work immediately have much less discomfort than those who rest for one to two weeks at home. The immediate return to normal activity greatly minimizes the incidence of postoperative complications. The results of the past four years have been gratifying to both employer and employee. Following operation, the worker has been able to carry out his duties more efficiently since he is not hampered by poor circulation in the legs. Since all venous stasis has been eliminated, he is much less susceptible to complications following injuries to his leg.

Summary

1. THE INCIDENCE and surgical management of varicose veins have been described.

2. All complications of varicose veins have been treated effectively by the use of appropriate elastic bandages, on an ambulatory basis.

3. A high ligation and complete stripping of varicose veins has been carried out on a semi-ambulatory basis. Anesthetic complications and morbidity are minimized by the use of local anesthesia.

4. Few postoperative treatments are necessary since all communicating veins are interrupted when the saphenous vein is stripped out.

5. The management of varicose veins on a semi-ambulatory basis has saved many industrial work-hours.

(1150 Park Avenue)

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Industrial Medicine Shipboard

WHEN his ship is at sea, the physician can never "leave the office." He finds that he is "stuck" with a group of patients just as they are "stuck" with him. At meals he may sit next to a patient with bronchitis and be served by a patient with an ingrown toenail. The physician works, eats, relaxes, and sometimes shares a compartment with patients and potential patients. The "boss" of every enlisted man he treats is an officer in the wardroom, and the patriarch of all is the captain. In a society so structurally inbred and physically confined there is little privacy. The doctor-patient relationship in this regard is seriously distorted. This is regrettable but neither insuperable nor totally without compensation, for here is an opportunity to observe not only the importance of each seaman in the functional efficiency of the ship but also the genuine (true, occasionally officious) concern of a man for his stricken shipmate. Such a situation is rich in the nuances of interpersonal relations. Newly assigned to his ship, the physician is amazed at the comprehensiveness of his duties. He may question that some of them are properly considered medical, for in all likelihood never before has he inspected fresh vegetables or bed linen. He finds himself without the broad base of supporting activities that inauspiciously guard the public health in all but the most remote areas of the country. He becomes his own sanitary engineer and his own preventive medicine officer. This means work, some of it unpleasant. It also means a deeper understanding and appreciation of the civilian public health structure within which he may later practice.

—From "Some Facets of Shipboard Medicine," by ARTHUR J. PRANGE, JR., Lieutenant (MC) USNR, in *U. S. Armed Forces Med. J.*, May, 1955.

Residual Motor-Skeletal Disabilities Among 215 Motorist Casualties

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LINKS in the life history of motorists involved in accidents comprise five groups: those who escape injury, immediate deaths, intermediate deaths (within 48 hours), delayed deaths, and survivors after injury. Each group has its own set of clinical and epidemiological implications. The present series is intended to supplement the fifth group—bridging the gap between hospital discharge (so to speak) and subsequent periods in the clinical life history of automotive crash victims. These people were seen by the writer in his office, consecutively, from late in 1949 through July, 1955, as new and ambulatory patients, in periods after their accidents which ranged between several months and several years. The universality of mechanically produced disabilities makes these kin to industrial injuries.

This point is also indicated in Table I which establishes the distribution of this series among the major age groups. Eighty-one percent involved the working span, and 58% the age group when degenerative conditions are minimal (20 through 45). Fifty-five percent were males.

Etiology

CRASH FORCES responsible for injuries to vehicular occupants derive from vehicular masses, speeds and the nature of their principal impacts (Tables II and III). It is to be noted that 70% of the vehicles were passenger cars and 30% were commercial carriers of one kind or another. About 25% of the accidents did not involve crashes between vehicles. Eighteen persons were forcibly ejected during impacts from their respective vehicles. In four cases the doors opened in cornering; the remainder happened with rollovers, spins, and rear-end and other types of vehicular and non-vehicular crashes.

The kinetic energy and decelerative rates resulting from crash conditions are of a high order, even under relatively slow speeds because of the geometric relationship which speed (squared) has to these values. The small decelerative distances which result between anatomy and structure on the inside of the vehicles may magnify these values greatly: to hundreds of g's (gravities) within milliseconds. This has focused attention upon interior automotive design (faulty) as a potent source of injury. In other words, the relation of occupants to impact areas may be a determinative factor in the frequency and degrees of injury sustained (Table IV). In this series, the order of vulnerability to injury was driver, right front seat passenger, and back seat passenger respectively, in descending fashion. This would seem to concur with current opinions with regard to acute injuries as well.

It is important for clinicians (and engineers) to remember that occupants are exposed to a variety of forces, the magnitudes of which have not yet been accurately determined. These forces are applied (impulsive) (crushing) and inertial (sometimes as a shock wave from a distance).

TABLE I.
AGE DISTRIBUTION AMONG 215 MOTORIST CASUALTY DISABILITIES OF THE MOTOR-SKELETAL SYSTEM

Age Range:	Number	Percent
up to 20 years	31	14
20 to 45 years	124	58
45 to 65 years	50	23
65 years and over	10	5
	215	100

TABLE II.
TYPE OF VEHICLES INVOLVED AND THEIR FREQUENCY

Collisions between Vehicles:	Number	Non-vehicular Crashes:	Number
Passenger cars	83	Passenger cars	37
Car and truck	29	Trucks	11
Truck and truck	2		
Trailer and car	2		
Truck and train	1		
Car and train	2		
Bus and car	2		
Car and snow plough	1		
Hay rack and car	2		
Car and ambulance	2		
	126		48

TABLE III.
PRINCIPAL IMPACTS

	Number	Percent
Forward collision	50	30
Rear-end collision	41	25
Roll-over	25	15
Right-angle collision	24	15
Carom (oblique)	9	5
Ran off road	9	5
Collision with fixed object	8	5
	166	100

TABLE IV.
DISTRIBUTION REGARDING SEX AND SEATING AMONG 215 MOTOR-SKELETAL DISABILITIES

Seating:	Male	Female	Total Number	Percent
Driver	89	24	113	53
Front seat	17	59	76	35
Back seat	11	15	26	12
	117	98	215	100

The interactions between anatomy and structure may be epitomized thus: human variable tolerances to impacts *versus* mechanical *variables* which offer unlimited opportunities for injury under certain conditions of ungoverned rapid decelerations. It is not surprising that, despite certain resultant patterns of injury under a set of mechanical conditions, by and large the residual disabilities are varied and complex and often difficult to evaluate

This problem is also complicated by medicolegal considerations. In this series 40% of the cases required disability ratings of that nature: among 53% drivers, 31% front seat passengers, and 16% back seat passengers respectively.

Pathological Anatomy

TABLE V lists the incidence and frequency rates of involvement of the various bodily areas in this series of patients. The neck, low back and lower extremities were about equally affected, the remainder being distributed among upper extremities and miscellaneous regions of the body. About 85% of the lesions involved the cervical, low back and lower extremity regions. Ten persons had combined cervical and low back disabilities, 70% of which were complicated by medicolegal considerations—seven drivers, and three front-seat passengers.

Table VI indicates that all areas of the vehicle expose their occupants to cervical disabilities, and that two-thirds of these lesions are so-called sprains. About one-third of the latter were produced by rear-end collisions ("whip-lash"). All types of injury were equally complicated by medicolegal considerations. It is to be remarked that herniated disks were suspected in only four instances of cervical sprain. Table VII would seem to establish the increased vulnerability of these people to cervical injuries as having been due to pre-existing osteoarthritis of the cervical spine in all age ranges, and all kinds of injuries. There were only eight uncomplicated cases in this group—seven drivers and one front seat passenger—in the third, fourth, fifth, sixth and seventh decades respectively.

It would seem that complicating arthritis, as well as the original forces, was responsible for the prolonged periods of disability experienced by so many of these patients. Undoubtedly, these people had a lowered tolerance to the forces they encountered at the time of the accident. Questions occur with regard to aggravation of the pre-existent arthritis and to preventive measures. I have no answer to the first. Obviously, very large factors of safety are indicated. How? This answer is being earnestly sought by both independent workers and researchers of the automotive industry.

There were 600 sprains of the low back region. Thirteen percent affected those up to 20 years; 70% those between 20 and 45 years; 17% those between 45 and 65 years; and none thereafter. From the standpoint of seating, 62% were drivers, 28% were front seat passengers, and 10% were back seat passengers, respectively. The types of impacts were similar to those which produced the neck injuries. The complications encountered in this group are listed in Table VIII. There were virtually no uncomplicated cases in this group. Undoubtedly, complications here, as well as in the cervical region, play a decisive role in predisposition to low back complaints as well as to prolonging the period of disability and convalescence.

TABLE V.
PATHOLOGIC ANATOMY AMONG 215 MOTORIST MOTOR-SKELETAL LESIONS

Body region involved:	Number	Percent
Cervical	66	28
Low back	65	27
Lower extremity	67	28
Upper extremity	26	11
Miscellaneous*	13	6
	237	100

*Miscellaneous includes: 2 post-concussives; 6 facial scars; 4 mandibular malocclusions; 1 infraorbital nerve anesthesia from fracture of the zygoma; and 5 residual complaints following severe pelvic fractures: abduction contracture of the hip, 1; obturator neuritis, 1; pelvic asymmetry, 1; coccygodynia, 1; and cystitis, 1.

TABLE VI.
RELATION BETWEEN SEATING AND NATURE OF CERVICAL INJURY

Seating:	Sprain	Subluxation	Fract-Disloc	Total No.
Driver	25	7	5	37
Front seat	13	3	4	20
Back seat	5	3	1	9
	43	13	10	66

Among 11 subluxations, four were rotary at the first cervical segment; four were horizontal shifts (C3 and C6). Four fractures affected the vertebral bodies of the first, third, fourth and sixth segments. Pedicles were fractured (six cases) among second, third, and fifth segments respectively (three at the fifth level).

TABLE VII.
INCIDENCE OF ARTHRITIS AS A COMPLICATING FACTOR AMONG THE CERVICAL INJURIES

	Up to 20 yrs	20-45	45-65	Thereafter	Total No.
Sprains	1	16	13	4	34
Subluxations	0	3	1	1	5
Fracture-Dislocation	0	0	4	0	4
	1	19	18	5	43

Psychological complications were present in four cases. Arthritis complicating sprains was mild, eight cases; moderate, 10 cases; advanced in five cases respectively. Disk spaces were variably narrowed in all of these cases at the levels of involvement in the moderate and advanced ones. One person had a Marie-Strumpell type of arthritis. One repeater had had a massive bone grafting done in the cervical spine some years previously (by the writer) for fracture-dislocation at the mid-cervical region. Arthritic complications were considered to have been present prior to the motorist accidents in almost every case in this series.

TABLE VIII.
CONCURRENT COMPLICATIONS AMONG 60 LOW BACK SPRAINS

	Medicolegal group	Non-medicolegal	Total No.
Arthritis	11	8	19
Congenital	3	3	6
Relaxed sacro-iliac	1	1	2
Suspected disk lesion	10	11	21
Scoliosis	0	2	2
Fascial lipoma	0	1	1
Schmorl's node	0	1	1
	25	27	52

Congenital lesions included spondylolisthesis, 3; horizontal sacrum, 1; reverse (?) spondylolisthesis, 1; sacralization fifth lumbar vertebra, 1. There were several of these cases complicated by psychological factors as well.

It is interesting to reflect that the low back situation is at the opposite extreme of the spinal column from the very mobile cervical portion of it. There is no whip-lash possible in the lower more massive part of the body from the sitting position, in the true sense of the phrase. This portion of the body is the one most easily amenable to restraint by safety gear (belts, etc.) Properly seated, the lower back is said to be in the most relaxed and least vulnerable position to injury. Perhaps more attention to automotive seating (proper design) will reduce the number of these low back complaints. The same may be said of safety belts. However, there are those who fear that the latter would increase whip-lash effects upon the cervical region. Be that as it may, low back disabilities offer another category among motorist casualty disabilities which are often lost sight of at the time of the accident and for the immediate period afterward.

Among those with injuries of the upper extremities, 50% sat in the right front seat (the only category where drivers were not predominant), 31% were drivers, and 19% sat in the back seat, respectively. Fifty percent of these lesions involved the shoulder joint; the remainder being distributed equally among elbow, wrist, forearm, and hand. Approximately two-thirds affected the soft parts: bursae, muscles, tendons, and joint capsules. Pre-impact positions determined in part the vulnerability and degree of injury sustained by most of these persons. By the same token, the difficulties with regard to factors of safety relative to these mobile and relatively small bodily masses become apparent and ought to be appreciated by the more unreasonable critics of the automotive industry. This point is best illustrated by the complete restraints (tied) applied to the extremities of volunteers undergoing decelerative linear forces experimentally (Stapp); conditions hardly applicable or desirable in vehicular occupants.

All areas of the lower extremities were involved. Fifty percent were drivers, 33% front seat passengers, and 17% were back seat passengers respectively. Twenty cases with internal derangements of the knee were of special interest: 12 meniscal (two lateral); six ligamentous (one cruciate); and one loose body and chondromalacia of the patella respectively. Only one of these cases was complicated by arthritis. Eighteen were noted among the younger age groups; one each also in the seventh and eight decades. The remainder of the lesions affecting the lower extremities were of the run-of-the-mill variety: soft, skeletal, and joint.

These peripheral lesions (lower extremity) implicate various interior design factors (impact areas) almost to the same degree that head, face and chest injuries (acute) do—namely, dash, steering column, floor pedals, etc. Thus, knees impacted dashes, steering columns and wheels; feet entangled foot controls, and sometimes got caught in partially opened doors (recurrent specter of ejection), under floor mats, under the back of the front seat; and occasionally legs were smashed because they were crossed at the time of impact.

From the seated position, it would appear that bodily restraint by seat belt would help to nullify some of the impacts suffered by the lower extremities—especially the knee-dash ones, many of which result in fractures of the patella, femur and hip joint (fracture dislocations). The knee derangements suggest that some of the kinematics of the human body under crash conditions exert forces of leverage as well as direct pressure effects.

It is possible that seat belt restraint would minimize this tendency by preventing bodily dislocations in the first place.

Summary

ON THE whole, from the standpoint of prophylaxis, it becomes ever more evident that no single factor will solve the problem of motorist injuries and disabilities, acute or chronic. Both external and internal automotive environmental factors need intensive scrutiny from the standpoint of reduction of injuries. Medical groups need to remain alert to diagnostic differentials between primary injury and secondary or concurrent complicating factors, as well as to recovery therefrom afterward. Above all, nothing can supersede the common sense objectives of accident prevention in the first place; assurance of safety under normal conditions through driver proficiency; proper road surfaces; and safety performance of the vehicle itself.

(415 Corby Building.)

Listen

OUR lives would be longer and richer if we were to spend a greater share of them in the tranquil hush of thoughtful listening. We are a noisy lot; and of what gets said among us, far more goes unheard and unheeded than seems possible. We have yet to learn on a grand scale how to use the wonders of speaking and listening in our own best interests and for the good of all our fellows. It is the finest art still to be mastered by men.

—WENDELL JOHNSON, quoted in "Do You Know How to Listen?" by LYDIA STRONG, in *The Management Review*, August, 1955.

Evaluation of Audiometric and Hearing Standards in Industry

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NUMEROUS industrial concerns have instituted hearing conservation programs of varying scopes but few have realized or utilized the full potentials of their program. This is a report of the hearing conservation program instituted during World War II at the California Division of Lockheed Aircraft Corporation, and covers in detail our experiences and observations for an 18-month period extending from January, 1952 to July, 1953.

Lockheed has been greatly interested in the human aspects of noise exposure since 1943 at which time an initial study was performed. A detailed plant-wide noise survey was conducted and followed by an intensive audiometric testing program. An excellent report of our early experiences was published in 1947 by McLaren and Chaney[1] who were among the first to conduct a comprehensive study of this scope. In 1948 the program was broadened to include all facets of industrial hearing conservation and became a standard Medical Department function and responsibility. Acoustic engineers in the Safety Department working in close cooperation with the Medical Department conducted a more detailed noise survey of the plant facilities to re-evaluate noise levels and composition and to identify all arbitrarily determined noisy areas and occupations. Such a survey was deemed necessary in view of the changing nature of our operations during the preceding five years. The Medical Department decided after careful deliberation and study to establish an over-all noise level of 85 decibels as a conservatively safe exposure level. A decision was also made to institute a comprehensive audiometric testing program for all applicants and employees assigned to jobs with predetermined noise levels in excess of 85 decibels. Such a testing program was eventually to include approximately 50% of all employees.

The program was initiated by performing audiometric examinations on all employees working in noisy areas. Contrary to the fears of many, the examinations did not result in any adverse reactions among the employees and did not precipitate a rash of claims against the company. This has also been the experience of other companies initiating hearing conservation programs. These early audiograms were classified in accordance with a method devised by McLaren and Chaney in relation to the extent and type of hearing loss.

The onset of the Korean conflict in 1950 resulted in accelerated aircraft production, a large influx of new employees and rapid expansion in all departments. It soon became apparent that modification and streamlining of the program were needed to facilitate the mechanics of testing and shorten various procedures to enhance its effectiveness. It was essential to initiate new policies, procedures and standards to delineate the extent of the existing noise problems; establish new criteria for simplification of performance, interpretation and classification of pre-

Fig. 1.
Soundproof testing room.

Presented at a Joint Meeting of the INDUSTRIAL MEDICAL ASSOCIATION and the AMERICAN ASSOCIATION OF INDUSTRIAL NURSES, at the 1955 INDUSTRIAL HEALTH CONFERENCE, Buffalo, New York, Wednesday, April 27, 1955.

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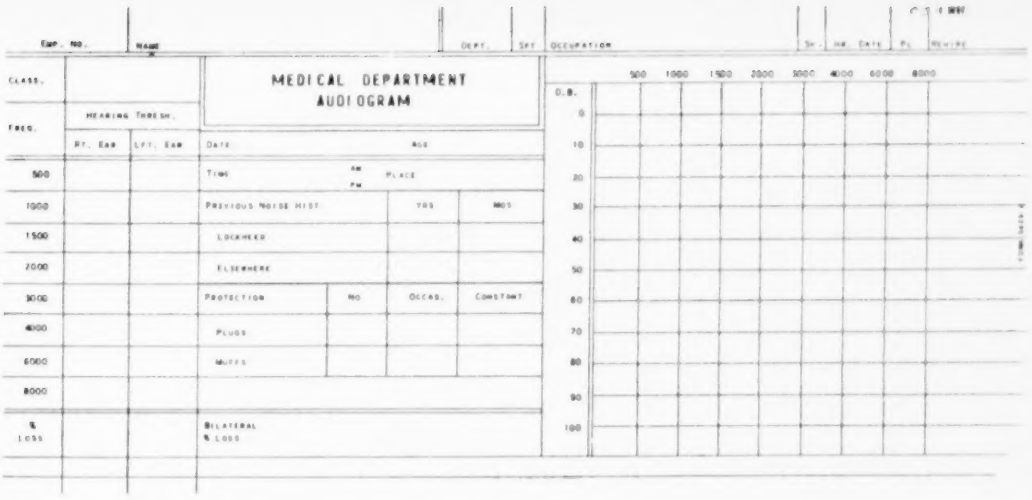


Fig. 2.
Audiogram test card.

employment audiograms; establish the periodicity of re-check examinations; define significant changes in terms of threshold elevation of important frequencies and percentage hearing loss; establish methods for disposition of problem cases, and, finally, determine the best method for education of employees and supervision in the need for auditory protection.

An intensive program of this type was instituted in January, 1952, during which 17,783 audiograms were performed on 15,183 employees in an 18-month period. These records were appropriately identified and segregated for later perusal and study. Each applicant for employment was given a complete physical examination including an otoscopic inspection by a physician. All applicants for positions predetermined to be noisy, i.e., above 85 decibels, and those who presented a history of auditory disease were referred to the audiometric testing section, located in a separate building immediately adjacent to the main examining facility. The testing section, Fig. 1, consists of two soundproof testing rooms, a central reception and file office and the chief audiometrist's private office. The applicant was received by a nurse-audiometrist who initiated an audiogram card developed at Lockheed (Fig. 2). The card, when completed, contains information concerning the applicant's past noise exposure both industrial and military, a history of infectious disorders and or diseases of the conduction apparatus of the ear, head injuries, use of various drugs, noise irritability and, if present, a history of familial auditory disease. In addition such information as the presence of excessive wax, foreign bodies and obvious external ear disease detected by the nurse was recorded. Compensation from any source for auditory impairment was also noted.

A sweepcheck audiogram with the audiometer set at plus 10 decibels was performed in all cases and if a hearing defect in excess of 10 decibels at any frequency was noted a true threshold test was done. Eight frequencies between 500 and 8,000 cycles per second were tested and the percentage hearing loss computed in accordance with the American Medical Association method of measurement. The results of the test were used by the nurse to classify the applicant's hearing in accordance with standards developed by the Lockheed Medical Department. The standards were written after a thorough review of the literature, investigation of the auditory practices of other industrial companies, consultation with numerous otologists and a critical analysis of our own past experiences. Cognizance was taken of the important consideration that certain categories of employees such as flight line mechanics and drop hammer operators with considerable past experience, constitute a highly desirable group of employees from an operational standpoint, but by virtue of their years of previous noise exposure might be expected to have some hearing loss. The standards were so promulgated as to include as many applicants under this consideration as possible but at the same time to set a definitive limit as to the risk involved in their employment.

The standards were also structured to simplify the classification of audiograms. It was found that the majority of the cards could be automatically classified by the audiometrist, without repetitious referral to the examining physicians. All cases that did not fall within the designated acceptable groups were referred to the examining physicians for a final evaluation prior to classification. From a practical standpoint this method of classification was highly effective in standardizing interpretation of the records despite the fact that during the 18-month period of the study, as many as 10 different physicians performed pre-employment physical examinations. Only two had specialized training in otology and audiology and in the absence of standards

a number of divergent opinions concerning interpretation and work classification might have resulted. The standards permitted uniform interpretation and classification of large numbers of audiometric examinations, with a minimum of direct medical supervision.

The pre-employment or placement standards are presented in condensed version.

A. ACCEPTABLE FOR EMPLOYMENT IN NOISY AREAS:

1. In general, all applicants with audiogram findings not exceeding standards listed below in either ear and not otherwise disqualifying, are acceptable for employment in noisy areas:

500 cycles per second	- 20 decibels
1000 cps	- 20 db
2000 cps	- 20 db
3000 cps	- 30 db
4000 cps	- 40 db
Above 4000 cps	- Unlimited

The total loss of hearing in the frequency range of 500, 1000, 2000 and 4000 cps should not exceed 14%, (AMA). Re-check audiogram will be made in six months where worker is subjected to noise above 85 decibels.

2. Variations in the above standards are acceptable provided total binaural loss in the test range does not exceed 20%. Applicants whose initial audiogram reveals 14.1 to 20% hearing loss or whose tests reveal threshold elevations at 3,000 or 4,000 cycles per second in excess of the general standards will be re-checked in one month. These applicants must wear ear protection and should not be exposed to noise in excess of 120 decibels.
3. Binaural changes involving hearing loss of 20.1 to 30% will be evaluated individually. Applicants employed with hearing loss in excess of 20% will be re-checked in one week. Ear protection must be worn and applicants should not be exposed to noise levels in excess of 105 decibels.
4. Applicants with perforated tympanic membranes will be accepted provided they meet the following requirements:
   (a) General hearing within standards outlined above.
   (b) No knowledge or evidence of active disease.
   (c) Ear protection of some type can be worn.

B. UNACCEPTABLE FOR PLACEMENT IN NOISE ABOVE 85 DECIBELS:

1. Temporary limitation (until cured):
   Any acute disease of the ear that either,
   (a) Precludes the wearing of ear protection.
   (b) Causes hearing impairment.
   (c) Produces constant tinnitus.
2. Permanent limitation:
   (a) Binaural hearing loss of 30 to 70%.
   (b) Any abnormality of the auditory apparatus that absolutely precludes the wearing of ear protection.
   (c) Chronic disease of the auditory or central nervous system such as persistent or repeated infection of the external canal; middle ear disease with discharge; Meniere's disease; tumors of the auditory nerve or central nervous system or severe disturbances in equilibrium.
   (d) A history of persistent noise intolerance.
   (e) Specific request of applicant.

C. ACCEPTABLE IN NOISY AREAS BUT NOT WHERE DEAFNESS WOULD CONSTITUTE A HAZARD:
Binaural hearing loss of over 70% whether congenital or acquired.

D. UNACCEPTABLE FOR PLACEMENT IN AREAS OF EXCESSIVE NOISE OR WHERE DEAFNESS WOULD CONSTITUTE A HAZARD: (Combination of "B" and "C").
Applicants whose audiograms reveal a binaural hearing loss of 30 to 70%.

On the basis of these standards pre-employment audiograms were classified as A, B, C or D. The distribution of 15,133 audiograms into these major categories and in relation to the applicants age groups is shown in Figs. 3, 4 and 5.

It is apparent that the degree and type of hearing impairment brought into industry by the new employee has in many cases a direct relation to age and that the impairment in the older groups simulates the changes usually seen in presbycusis. Significant changes are first noted in the 40 to 49 age group with progressive changes in all major frequencies in the older groups. In the majority of instances the maximum hearing loss is at 4,000 cps with the most precipitous change occurring between 2,000 to 4,000 cps.

Fig. 4 reveals the mean loss for applicants in classification "A," further divided into subgroups as follows:

1. Less than 14% binaural loss.
2. 14.1 to 20%.
3. 20.1 to 30%.

A total of 14,174 employees representing 93% of all applicants tested were classified as "A," subgroup 1, and indicates subjects with essentially normal hearing. In addition smaller groups of 244 and 106 were classified in subgroups 2 and 3 respectively and were employed in noisy occupations despite their moderately severe hearing loss.

There were 367 applicants barred from employment in noisy areas as they fell within the "B" classification as shown in Fig. 5. Since many of these were so classified because of auditory conditions not necessarily associated with extensive hearing loss, the mean hearing loss was not as severe in this group as in "A" subgroups 2 and 3 who were accepted for noisy jobs. However, 71% of all "B" applicants were actually employed in non-noisy occupations, an action made possible by the extensive demand for all categories of labor in a rapidly expanding aircraft industry.

Relatively few "C" classifications were identified and these were divided among congenital deafness and acquired severe deafness. Because of their handicap subjects in this category do unusually well in areas of high noise intensity but cannot be safely placed where dependence

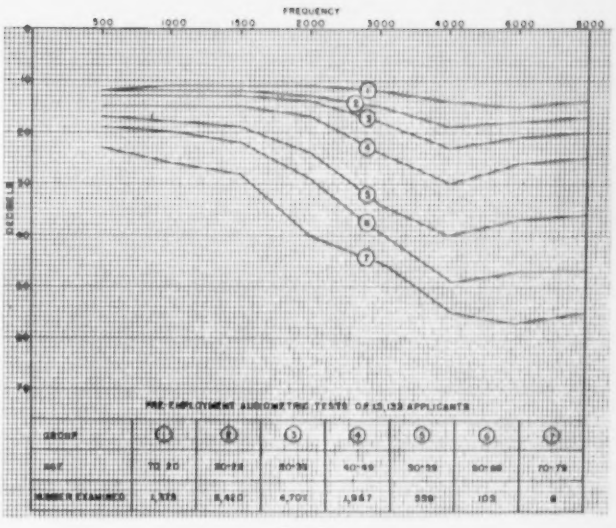
upon oral communication or auditory signals is necessary. Of this group 78% were successfully placed.

A total of 206 applicants were given "D" classification. This essentially combines the "B" and "C" limitations and was applied in cases where the hearing loss was moderately severe and might possibly deteriorate further and where the auditory acuity was so impaired as seriously to interfere with signal reception. It was possible to place 79% of these in non-noisy occupations.

It is apparent that under this system audiograms were easily classified into one of four major categories and the system permitted maximum employment consideration for all applicants. Not a single applicant in the original group of 15,133 was rejected outright because of auditory pathology and only 85, or less than 0.6%, could not be employed because of auditory or hearing difficulties. We feel, therefore, that the system was sufficiently liberal to allow the placement of a large number of employees at a time when their services were urgently needed and in great demand, but at the same time, through selective placement and occasional elimination, it minimized the possibility of auditory and bodily damage through injury, with subsequent lessened risk of liability to the company.

Once the employee was accepted for work in a noisy occupation he was indoctrinated by the audiometrist in the necessity for ear protection. Through tactful explanations and demonstrations attempts were made to sell the hearing conservation program to the newly hired employee at a time when he was most receptive. Large anatomical charts of the ear and various eye-appealing posters were used to illustrate and emphasize important points. Emphasis was placed upon the prevention of nerve fatigue rather than nerve damage or hearing loss. The subjects were advised that they could choose from a variety of ear protective devices including wax impregnated cotton and synthetic rubber inserts. If the latter were chosen the correct size was determined by the audiometrist and the employee instructed to obtain a supply of the devices at the nearest medical aid station or safety tool crib. It has long been our opinion that it is more desirable to sell and promote the proper use of ear defenders than mandatorily to require their usage. A small percentage of employees resist the insertion of any foreign object into their ears, and it is our belief that compliance by a majority of properly indoctrinated employees is preferable to a more widespread but improper usage of the devices.

The audiometrists employed at Lockheed during this study were all registered nurses with previous experience in industrial medicine. Their work was limited to audiometry and each received intensive "on-the-job" training from the chief audiometrist. In addition they attended at least one academic course in audiology and audiometry at a local university. We are fortunate that in the Southern California area such courses are presented during evening hours at several major universities.



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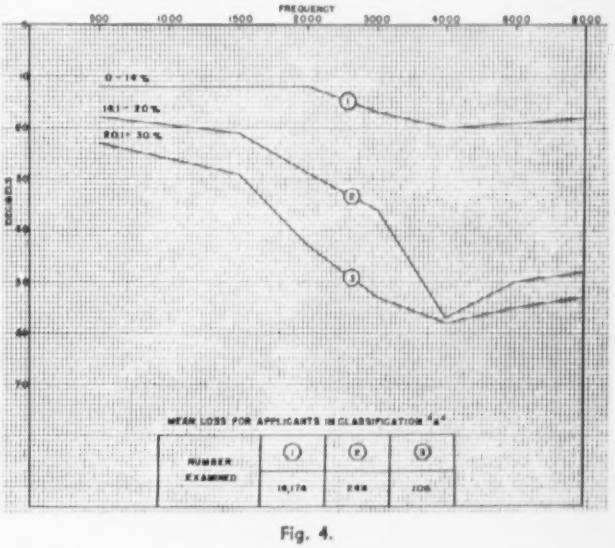

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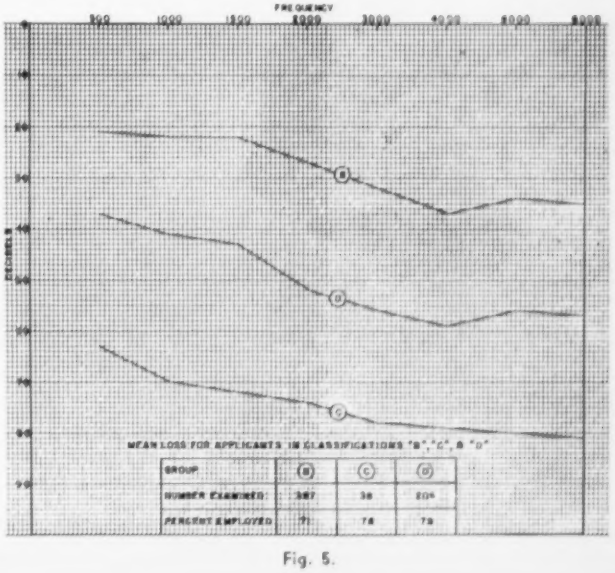

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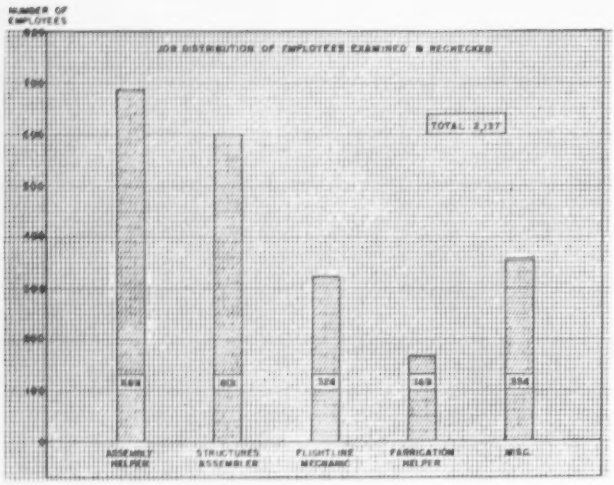

Fig. 6.

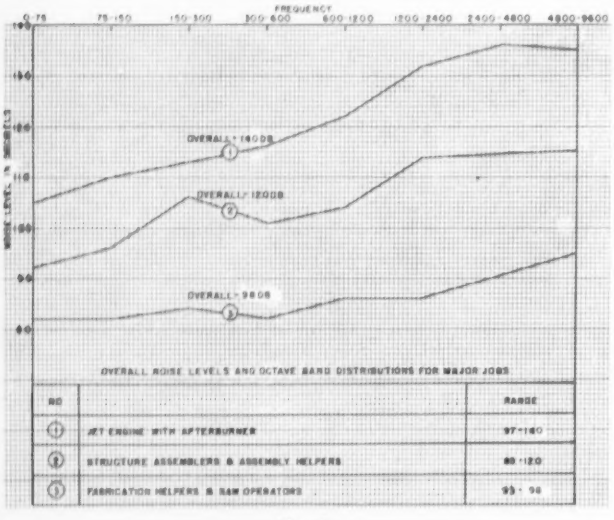

Fig. 7.

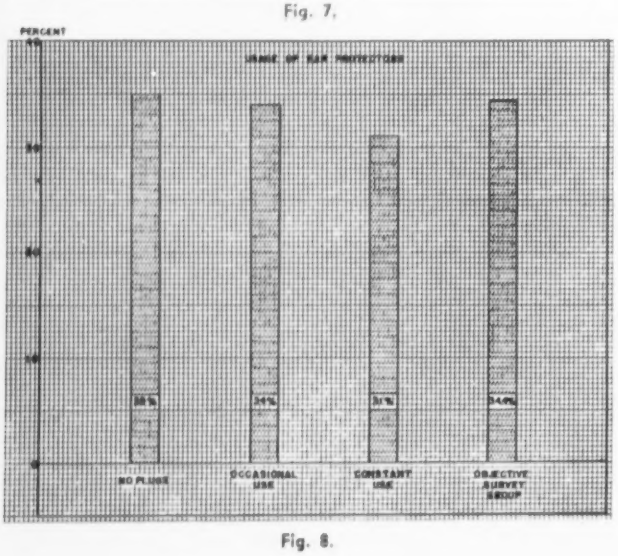

Fig. 8.

Once an applicant was accepted for employment in a noisy job his audiometric record was filed in the audio section. Based upon his original findings and in accordance with our standards, the employee was re-examined at regular and predetermined intervals. A summary of our standards as they pertain to significant audiometric changes and periodicity of re-checks follows:

A. GENERAL PROCEDURES:
   1. Re-check audiograms will be performed on new employees in factory areas as indicated at time of pre-employment examination, that is, in six months, one month or one week.
   2. Stabilization of audiograms at six months requires routine six month re-checks.
   3. Routine six month re-checks will be performed at the start of the working shift prior to exposure to noise, whenever possible.
   4. Re-check audiograms must include information concerning change in job status, time of day performed, estimate of time following removal from noisy area, subjective complaints, history of intervening ear pathology, and use of ear protection.

B. SIGNIFICANT AUDIOMETRIC CHANGES:
   1. Employees exposed to noise for *18 months or less.*
      (a) *Unilateral:*
         (1) Threshold change in excess of 20 db at 3,000, 4,000 or 6,000 cps above original findings.
         (2) Threshold change of over 15 db at 1,000 or 2,000 cps above original examination.
         (3) If above limits are exceeded and employee has not worn ear protection, an additional audiogram will be made at the start of the work week. If changes persist, employee must wear ear protection and have additional re-checks at one to four week intervals to determine true threshold.
      (b) *Binaural:*
         (1) Progressive loss of over 10% in the frequency range of 500-4,000 cps using original audiogram as basis for comparison.
         (2) Total loss at any time exceeds 30% irrespective of original findings.
         (3) If above limits are exceeded, re-check at start of work week. Must wear ear protection and have re-check in one to four weeks. If standards are still exceeded, remove from noisy area.

Approximately 2,650 re-check examinations, using the above criteria for periodicity, were performed on 2,137 employees. The major job-distribution is shown in Fig. 6. The majority of employees were assembly helpers or structural as-

semblers with a lesser number of flight line mechanics and fabrication helpers. A total of 354 were in miscellaneous occupations. The total number of occupations of personnel in the survey was over 80; however, for purposes of this study major emphasis was placed upon the four job groups previously enumerated.

The over-all noise levels and energy distribution for the major jobs are shown in Fig. 7. Exposure noise levels varied from a measurable over-all low of 85 decibels for the structural assemblers to a maximum high of 140 decibels for the flight line mechanics servicing jet engines with afterburners. The spectral distribution reveals maximum noise levels from 2,400 to 9,600 cycles per second. Since much of the energy is concentrated in octave bands to which the ear is thought to be most sensitive, the need for ear protection is apparent. Fortunately most ear protective devices attenuate maximally within these octave ranges.

Fig. 8 outlines the voluntary acceptance of all types of protectors among the employees reexamined. Subjectively approximately one-third of all employees admitted no usage of ear protection at any time, whereas two-thirds claimed to wear protection occasionally or constantly. An "on-the-spot" objective survey of a representative group revealed approximately one-third to be wearing protective devices during noisy operations.

The majority of employees preferred the wax impregnated cotton to the synthetic rubber insert-type defenders. The wax protectors are generally more comfortable and easily molded to occlude the external canal. Their attenuating properties are comparable to those of most synthetic rubber inserts. The chief objection to the wax plugs is the ease with which they become dirty and the need for almost daily replacement. They tend to collect particulate matter and are unhygienic for repeated use. They also have a tendency to soften during the heat of the summer and to irritate the external canals.

Synthetic rubber inserts have a smaller degree of employee acceptance owing primarily to the difficulty in obtaining an adequate fit, the occasional discomfort associated with a tight fit, and the need for repeated cleansing.

Properly fitting ear protectors provide maximum attenuation of 30 to 40 decibels between 3,000 to 6,000 cps.

The use of plain cotton has been discouraged because of its poor attenuating qualities and unhygienic characteristics. Despite this a number of employees continue to use cotton wads because of their comfort.

Ear muffs are worn by flight line mechanics generally in combination with insert-type defenders. Ear muffs *per se* do not attenuate as effectively as insert-type defenders especially in the lower frequencies and are not advocated as substitutes for insert defenders. Occasionally, however, they are used by employees who cannot or will not wear insert defenders. Ear muffs when worn in addition to insert defenders add approximately 10 decibels of attenuation between 2,000 and 6,000 cycles per second. For this reason personnel such as flight line mechanics who are exposed to extremely high noise levels are encouraged to use muffs and insert defenders in combination. Lockheed has recently developed an effective and comfortable Lockfoam ear muff which is currently used by our flight line personnel.

Regardless of the type of ear protection utilized by the employee, it was found that there was no interference with speech or signal reception, when worn in noise. To the contrary, they appear to enhance speech reception. Employees were enlightened on this important consideration and advised not to remove their ear protection while conversing in noisy locations.

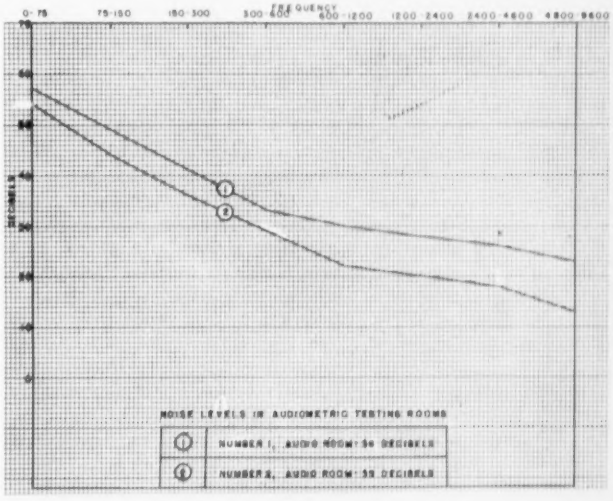

Fig. 9.

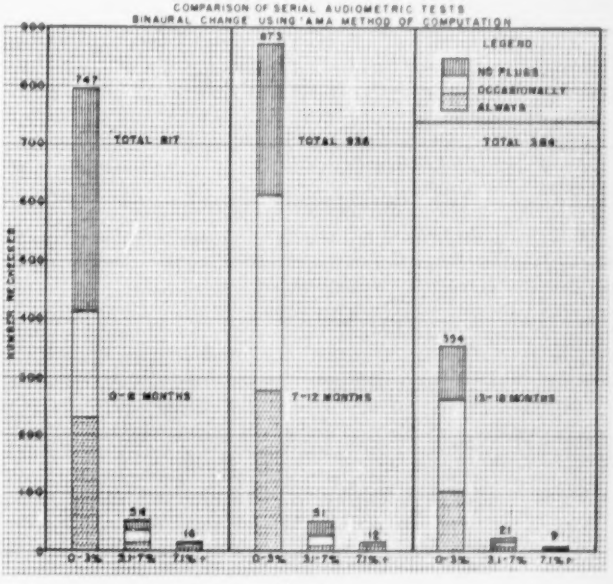

Fig. 10.

FREQUENCY OF SIGNIFICANT CHANGES IN SERIAL AUDIOGRAMS

	OVER 10 DECIBELS		OVER 20 DECIBELS			OVER 10% BINAURAL	EXCEEDS 30% BINAURAL
	1000	2000	3000	4000	6000		
0 - 6 MONTHS	8 (2)*	8 (3)	3	13 (1)	9	5 (3)	3
7 - 12 MONTHS	3	5	3	8	7 (3)	4 (3)	2 (2)
13 - 18 MONTHS	0	4	4	5 (1)	3 (1)	3	0

(*) REMOVED FROM NOISY JOB

Fig. 11.

Audiograms were performed in two testing rooms. The over-all noise levels in the testing rooms were 58 decibels in room No. 1 and 55 decibels in room No. 2. Despite these relatively high over-all ambient noise levels the octave band distribution as shown in Fig. 9 revealed the intensity peaks above 300 cps to be less than 40 decibels. In view of the spectral distribution significant masking effects were not anticipated and did not occur in practice.

The comparison of serial audiometric tests on the basis of binaural change for the frequencies of 500, 1,000, 2,000 and 4,000 cps using the American Medical Association method of computation is graphically illustrated in Fig. 10. In an effort to establish time-noise noise exposure relationship, re-checks were divided into three major groups as follows: the first group consisting of 817 employees had audiometric re-checks within a six-month period; in the second group of 936, comparison was made on the basis of the pre-employment and the last audiogram performed between seven and 12 months after exposure; the third group of 384 employees was compared on audiometric records made 13 to 18 months following employment.

The groups were further subdivided on the basis of the calculated binaural change using 0 to 3% as being comparable to the original record; 3.1 to 7% as questionable but still within technical variation in performing the tests; and finally over 7.0% representing those with significant hearing changes. Also identified is the percentage of employees who subjectively acknowledged the use of ear protection continuously or occasionally for each group and subgroup studies. It is again stressed that the indicated binaural change is a percentage reflection of the findings on the last audiogram as compared to the initial pre-employment test.

It was found that the great majority of employees showed essentially no change in their hearing acuity over the 18-month period of study and there was no appreciable difference in the various groups, despite use or non-use of ear protection. At the other extreme a small number of employees did reveal significant hearing changes, these totalling less than 2% of the entire study group. Detailed studies of the cases in the latter group have not as yet been completed, however, cursory examinations reveal that both nerve and conduction losses were present.

Fig. 11 reveals the number of audiometric records with significant changes that required referral to the supervising physician. Each case was re-evaluated by the doctor. The distribution of significant findings, in terms of decibel elevations at the various frequencies, binaural change in excess of 10% and any change exceeding a total of 30% binaural loss, was determined as outlined in the standards by comparison with pre-employment tests. Numerically the greatest number of significant changes (47) occurred in the group exposed for less than six months, however, employees exposed for 13 to 18 months revealed the highest percentage of significant changes in view of their relatively small representation (384) in the study. The table reflects only the single maximum change for any one record. It is apparent that the most significant changes occur earliest and with greatest incidence at 4,000 or 6,000 cps. This is in keeping with findings noted by most other investigators. It was interesting to note the relatively large number of employees who revealed maximal significant changes at 1,000 and 2,000 cps.

Only 15 employees were actually removed from their primary occupation as a result of these changes. The greatest number and percentage of such removals occurred among the group with less than six months of exposure. This accounts, in part, for the low removal incidence among the other two groups as employees with significant early hearing changes are apt to be removed from further exposure during their first six months of employment. Because of the large labor turnover in the aircraft industry, the numerical representation of new employees decreases considerably after one year.

Summary

A REVIEW of a hearing conservation program at Lockheed Aircraft Corporation is presented, with detailed information concerning the establishment and effectiveness of audiometric and hearing standards. Historically, the company first established its program in 1943 and as a result of its early experiences decided to institute a comprehensive and sustaining program in 1948. This program was eventually to include approximately 50% of all employees. Audiometric hearing tests were performed on all employees working in areas or at occupations where the noise levels exceeded 85 decibels.

As a result of an accelerated hiring program in 1950 it was found necessary to modify the basic procedures for purposes of simplification, to establish hearing and audiometric standards for the uniform classification and interpretation of records and more accurately to determine the periodicity of re-examinations. Fifteen thousand one hundred and thirty-three pre-employment audiograms performed over an 18-month period, from January, 1952, to July, 1953, were segregated and classified according to the newly established standards. It was found that

all records could easily be classified by the nurse-audiometrist and only a small percentage were referred to the supervising physician. Ninety-six percent of all applicants were accepted without noise exposure limitations, indicating fairly liberal standards for employment and allowing the hiring of applicants during a period when their services were urgently needed. The majority of these employees, 93%, revealed less than 14% binaural change as determined by the American Medical Association method of computation.

A very small number of applicants were found unsuitable for employment in noise as a result of ear pathology or progressive hearing loss; however, 71% of these applicants were reclassified and employed in other positions within the restrictions of their limitations.

An extremely small number of employees with over 70% binaural hearing loss required restriction from areas where loss of hearing would constitute a hazard; however the majority of these applicants were employed in other areas, and because of their hearing handicap were exceptionally well qualified for employment in extremely noisy jobs.

Utilizing our standards it was possible to employ 99.4% of all tested applicants in some position in the company. There were no outright medical rejections because of ear pathology and the data indicate fulfillment of the principle of selective placement to the very highest degree. The small number of applicants who could not be employed because of their limitations represented an extremely poor risk group.

An intensive program aimed at the voluntary acceptance of ear protective devices resulted in wearing of ear protection by one-third to two-thirds of all employees requiring their use. Despite statistics revealing relatively little change for short duration noise exposure among employees not using protection, it is felt that the use of such devices should be emphasized. The compulsory use of these safety devices is advocated when voluntary acceptance is poor.

Specially trained nurse-audiometrists were employed during the program. It is our strong recommendation that nurses be utilized for audiometric testing; however, under some circumstances it is possible to train technicians in the technique of performing these tests. In the latter cases it is suggested that all records be reviewed by an otologist or a physician trained and interested in audiology and audiometry.

Re-check examinations were performed on 2,137 employees concentrated in four major job categories with over-all noise levels from 85 to 140 decibels. The re-examinations were performed in test rooms with maximum ambient noise levels of 58 decibels, but with spectral distribution minimizing masking effects in the test range.

Test groups were divided according to months of exposure in multiples of six and hearing changes calculated in terms of no significant change (0 to 3%), within technical variation (3.1 to 7%) and significant findings if over 7%. Changes were determined by comparing the last available audiogram with the pre-employment record and in accordance with the American Medical Association method of computation using frequencies of 500, 1,000, 2,000 and 4,000 cps.

There were relatively few significant binaural changes during the 18-month study, the total for all groups being less than 2%. Some of these changes were apparently unrelated to noise exposure.

The earliest significant changes above pre-employment findings were threshold elevations in excess of 20 decibels at 4,000 and 6,000 cps. Threshold elevations in excess of 15 decibels at 1,000 and 2,000 cps were noted in a number of cases during the first six months of exposure. Relatively few employees in the entire group with significant changes required noise exposure limitations and job reclassification.

Our experiences at Lockheed during the past 15 years establish the desirability and necessity for a comprehensive hearing conservation program in an airframe manufacturing company and may be extended to other industries with comparable noise exposure levels. Such a program should include routine audiometric tests for all employees working in noisy areas. This testing should start at the time of hire and be performed as part of the original placement examinations. It is recommended that standards such as those developed at Lockheed be utilized to insure uniform interpretation and classification of records, maximum utilization of manpower and minimum risk of liability to the company.

In an industry such as Lockheed, and assuming good employee acceptance of ear protection it appears that routine six-month hearing re-checks are entirely feasible and involve a minimum of risk to the employee and negligible liability to the company. Examinations at more frequent intervals should be selectively restricted to the few borderline cases in which the probability of significant changes during short-time exposure seems likely.

The hearing conservation program has caused no increase in compensation cases, and, in our opinion, has been highly effective in protecting the company against unjust liability claims. Our accomplishments have more than justified the cost of the program.

Personal Protective Devices Against Noise

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Boeing Airplane Company, Seattle, Washington

IT IS the responsibility of the industrial physician to protect the individual employee from hearing loss that is the result of exposure to industrial noise. In order for him to discharge this responsibility he must evaluate his plant to see if a noise problem exists. He must make himself aware of the type of noise involved. Is it a constant rumbling of general factory noise or are there sharp peaks of loud noise? Is the loud noise continuous or is it interrupted? Are there sudden impacts that cause the noise? Of what intensity is the noise?

The part that the acoustical engineer can play in noise evaluation is very important. He can determine the noise level and the type of noise in areas that the industrial physician feels are critical. If the survey shows that certain areas or individual operations are in a high noise level category, then means must be found either to reduce the noise level or protect the workers.

The engineer must determine if it is feasible to treat acoustically the area involved. He must also determine if it would be possible to treat a noisy machine to decrease the noise at its source. Acoustic treatment may solve the noise problem. If not, the industrial physician then must advise on the type of personal protective equipment to be used.

IN THE aircraft industry it is often impossible to screen the noise at the source; therefore, some means must be found to protect the individual worker. Basically, a personal protective device must give attenuation to the point where the noise (sound pressure level) does not cause damage. This protection must be for both high and low frequencies. In our experience there are three main groups to consider in affording personal protection: (1) those in the riveting and production area; (2) those in the hammer shops; and (3) those working with jet engines. There are other smaller groups in experimental work as in the wind tunnel and the armament section that have noise exposure.

Riveting and Production (includes saw operators, spindel shapers, etc.): The noise in such areas may be of a fairly constant nature, with peaks in the immediate vicinity of an operator. Not only the riveter himself but also the buckers and mechanics working in the same area are exposed. Ear plugs offer adequate protection in these areas if they are worn, but the average worker will not wear the ear plugs continuously unless he is forced to do so. Ear plugs must be fitted to the individual if protection is to be effective.

Hammer Shops: Noise for a hammer operator is greatest at the time of impact of the hammer, but with a large battery of these machines, the over-all noise level is rather constant. In general, the old-time hammer operator may consider it a badge of his trade to be somewhat hard of hearing, so will not wear any protective devices except under protest.

Jet Engines: This is the area of the highest noise (sound pressure) levels and where no acceptable protective device is available. All available commercial types have been tested but do not protect adequately against jet noise at full power. The sound pressure level about the J57 jet engine is 130-140 decibels at 100% power. With afterburner attached to the J57, levels of 160 decibels are recorded. All protective devices whether plugs, muffs, etc., give a rather good degree of attenuation for the high frequencies. With ear plugs plus helmet-muff (the best practical protection yet available), hearing loss may still occur in some persons exposed to 130 to 140 decibels.

It is obvious, therefore, that with the higher levels now attained with afterburners, hearing protection device development is even more important.

SELECTION of the type of personal protective device must be based on the type of noise exposure. Educating the worker to the use of protective devices is the first step in a plant program. The foreman must be educated first; it is obvious that a program will fail if a foreman tells his subordinates he has been in noise for years and still hears well. The average employee will not wear ear plugs unless he is forced to do so. Busy foremen cannot be expected to patrol noisy areas looking in ears for an ear plug that is almost invisible. The physician can't be too enthusiastic about enforcing the constant wearing of a device which can be uncomfortable or

Presented at a Joint Meeting of the INDUSTRIAL MEDICAL ASSOCIATION and the AMERICAN ASSOCIATION OF INDUSTRIAL NURSES, at the 1955 INDUSTRIAL HEALTH CONFERENCE, Buffalo, New York, April 27, 1955.

even painful, which can cause sensitization, or which cannot be worn in the presence of a draining middle ear. Management is concerned that an unpopular edict on enforced wearing of plugs may create poor employee relations. Nevertheless, hearing protection must be afforded.

WITHIN our company a noise abatement committee has been appointed to study the noise problem and to make recommendations to management.

Physicians are committee members. One of the functions of the committee is the study of the community noise problem. A curfew on the hours of engine runs has been a temporary solution. Studies have led to the following recommendations in order to offer protection to the worker:

1. Limit the noise exposure time of flight mechanics working on jet engines.

2. Reduce engine-run time to a minimum. By studying engine-run requirements, Boeing experience indicates that exposure time can be cut significantly.

3. Rotate the flight mechanics so that exposure to jet noise is not confined to a few workers. This allows more time for the ears to recover from a single noise exposure.

4. Limit the number of mechanics that are actually required to conduct the tests by (a) use of portable sound attenuation booths for observers and fire-bottle handlers, by (b) development of remote-control engine-trim devices.

Let us consider the personal protective device itself. The most discouraging factor in protection against noise is the lack of acceptable protective devices.

The Ear Plug—An earplug should be smooth, have no abrasive action on the external canal, be non-sensitizing, lend itself to easy cleaning, and be as comfortable as possible. It must be fitted to the individual by a trained technician. At present we are using the V-51-R type earplug and find it perhaps the most widely accepted. Some waxed cotton plugs are employed to fit the variant ear canal.

Muffs—These should fit snugly to the head and be free of projections which can catch on machinery and structures. They must clean easily and not cause undue pressure symptoms or perspiration at contact points.

Helmets—The firm type of helmet (similar to a football or crash helmet) is rather cumbersome, expensive, warm, and hard to get on and off. The helmets do reduce the sound energy transmitted to the bones of the head. The face should be covered if the helmet is to give maximum effectiveness. There are also the soft cloth helmets, containing various types of muffs, that are more comfortable and do an adequate job of attenuation if the noise levels are moderate.

The combination of ear plugs and a helmet gives more protection than either alone, and must be used to protect against intimate exposure to jet noise.

AFTER the industrial physician has determined the need for noise protection and set up a personal protective program, then he must discover whether the adopted measures are effective. By audiometric findings, he will be able to determine the efficiency of the protective devices. It is necessary that audiograms be performed prior to initial noise exposure and then repeated at intervals determined by the findings and the level of the noise exposure. Remember always that one must evaluate any hearing loss by taking into consideration the history and previous noise exposure of each person in a noisy area. Don't blame the hearing loss of the ex-artillery man or naval gun captain, the skeet instructor or dynamite blaster, on the noise in your plant. Careful pre-employment and periodic audiograms will soon detect progressive hearing loss and thereby assist in revealing the effectiveness of your protective devices. The audiograms will reveal whether ear plugs are being worn even in more moderate noise level areas. The fact that one can determine this from valid audiograms alone puts pressure on the employees to comply with plant regulations on the wearing of plugs.

THE results of the use of personal protective devices at Boeing Airplane Company can be summarized as follows:

1. *Ear Plugs*—The V-51 plug gives good protection for high frequency in our riveting areas. The attenuation is poor in the lower frequencies. We obtained attenuation of 35 decibels at frequencies above 2000, and 5-8 decibels at low frequencies. Periodic audiograms on the riveting group do not show loss if ear plugs are worn.

2. *Muffs*—These give good attenuation at high frequency but poor protection at low frequencies. They are quite expensive in comparison with ear plugs for the slight extra protection they afford.

3. *Helmets and Muff Combination*—Gives about the same protection as do the muffs. Some studies by the Aero-Medical Laboratory on the attenuation afforded by ear plugs have recorded attenuation of 26 decibels in the frequencies up to 1000 and then increasing to 40 and 50 decibels attenuation in the higher frequencies. Our experience has shown that in actual practice this attenuation is unobtainable. We find that 5-8-10 decibel attenuation at frequencies below 2000 is the maximum obtainable in actual practice. With the higher levels now and to be attained by jet engines, it is vital that more research be done to develop adequate noise protective devices.

Anthrax—Agricultural and Industrial

—INFECTION, TREATMENT, AND PREVENTION

RAM VASWAMI, Cleveland Heights, Ohio

ANTHRAX is a soil disease which affects both animals and human beings. The infection among animals usually can be recognized easily. However, in men, the disease is marked by the rapidity of its progress and patients supposedly infected with anthrax have been known to die within a period of two or three days, even before the disease is correctly diagnosed. This is especially true in some countries of Asia and North Africa where the shortage of doctors trained in diagnosing such an infection is still a problem.

Other factors which add to the terror of the infection in human beings are:

1. It is no respecter of persons. Even veterinarians engaged in the work of stopping the spread of the disease have been known to have died of the infection.
2. It is distressing and may result in permanent disfigurement.
3. Its early symptoms are difficult to recognize and the internal form of anthrax is difficult to diagnose.
4. The danger is continuous; the worker is continuously exposed to the infection.

Although anthrax is not a serious menace in the United States, human deaths due to the disease do occur every year. Thus, 60 human deaths due to anthrax were reported to the National Office of Vital Statistics, Public Health Service, in 1951.[1]

This article deals with the nature of anthrax infection, some problems of agricultural and industrial anthrax, and the treatment and preventive measures for the infection.

Nature

ANTHRAX is essentially a soil infection caused by *Bacillus anthracis*. It originates in animals like cattle, sheep, goat, horses, mules, deer, swine, mink, and sometimes even in elephants. Dogs, cats, and certain game are also known to be susceptible to the infection. Anthrax spore may infect a man or an animal after having remained viable for a number of years in soil or water, and in hair, hides, wool or other animal products.[2] For this reason, livestock grazing in a pasture once infected with anthrax organism are likely to be infected with anthrax. Since the spore can remain viable under water, floods can also spread anthrax infection from one pasture to another.

Anthrax can spread from one locality to another neighboring or distant locality by the following means:[3]

1. Contamination of soil, drinking water, and pastures with discharges of diseased animals may be a cause for the spread of anthrax.
2. Dogs and cats may spread the infection; and similarly, animals and birds which eat putrifying flesh may also spread it, as well as flies and other types of insects which infest dead or dying animals.
3. Streams contaminated with surface drainage from anthrax-infected soil or tannery wastes also spread the infection.

Under adverse conditions of heat and moisture, such as exist in many countries exporting hides, infection from a single skin in a bale may permeate the whole bale and be a source of infection in the importing country.

Agricultural Anthrax

THE incidence of agricultural anthrax in the United States is low as compared to that in Asia and in some African and South European countries where animal husbandry methods are still primitive. The total number of animal deaths in the United States attributed to anthrax during the period 1945-1948 was 7,134, with 504 outbreaks (average annual deaths 1,784 with 126 outbreaks), with Louisiana topping the list and reporting 4,200 deaths and two outbreaks. California reported 817 deaths during the same period with 144 outbreaks which is the largest number of outbreaks in any state in the United States during the period 1945-48.[4]

Agricultural anthrax is still a serious menace in the Asian countries. In Iran, for instance, approximately one million sheep died reportedly of anthrax in 1945. Drs. Wolff and Heimann have suggested that a relationship exists between the incidence of anthrax and the size of the livestock herd. In England, Australia, and South Africa, where the incidence of anthrax is negligible, the size of livestock herds is large and modern methods of animal husbandry are used. The converse is true in Asia where the standard of living is low and the size of livestock herds is small. Often nomads, who are not amenable to any regulations, own livestock and animal husbandry is carried on by primitive methods.[5]

Most shepherds and cattle handlers recognize the disease, as the infected animal usually starts bleeding through the natural body openings. Swelling also appears on different parts of the

body of the infected animal. If the infection is acute, the animal may die in a day or two; however, if it is subacute, the animal may die in three to five days or longer, or may even recover in several weeks. When the disease is detected and brought to the notice of the veterinary authorities in the early stages, it can be controlled and prevented from spreading. Many countries have regulations requiring the examination of all animals in the infected area, the segregation of infected animals, and the proper disposal of carcasses of animals dying of anthrax, either by completing cremating them or by burying them at least six feet deep under a layer of quicklime. In areas where the disease has been known to exist, herds of animals are protected by frequent prophylactic inoculations.

In some areas, there are regular seasons during the year for anthrax, and these seasons usually occur during the periods when flies and insects infest the areas. It is advisable to inoculate the animals with prophylactic serums just before the beginning of such seasons.

In spite of regulations requiring the reporting of outbreaks of anthrax to the veterinary authorities and the safe disposal of carcasses of dying animals, the problems in Asian countries, where the standard of living is low, bristles with economic difficulties. To the owner of a small herd of livestock, who values his animals more dearly than the members of his own family, the income from hides, hair, and wool of even one animal means much and he feels, often mistakenly, that he can ill afford to destroy the remains of an animal that has died of anthrax.

Lack of appreciation of the hazard on the part of livestock owners is also a cause for the spread of infection. Sick animals are often left to die in fields and thus infect pastures. Primitive methods of depilation and subsequent washing and drying of hair, as are often practiced in the Asian countries, are likely to cause the spread of anthrax spores from infected hair to the originally un-infected hair.

Industrial Anthrax

WHEN anthrax infects man, it affects the lungs and or skin of the patient and has a general toxic effect on the whole body. Industries where it is likely to occur are the woolen mills, wool carpet industry, goat hair handling industry, brush bristle industry, hide processing industry (including the leather tanneries), slaughter houses, cattle handling, and sometimes even cargo unloading.

The following cases of anthrax reported in the literature are cited here as a matter of interest:

1. A worker employed on sawing elephant trunks for making piano keys in the United States died of anthrax. It was later found that the elephant trunks, which were imported from East and West Africa, were the cause of the infection.[6]

2. An infant boy, aged one year, lived on an American farm and was scratched on the leg by the teeth of a pet dog with which he was playing. The dog had fed on the unburied carcass of a calf that had died of anthrax. The boy died shortly after the scratch. A pure culture of anthrax was taken from the infant's leg. This incident occurred in 1915.[7]

3. Cases of anthrax have been reported among personnel in the British Navy who have used shaving brushes or tooth brushes bought from natives in foreign countries.[8]

Notification of the disease: Section 29 of the British Factory and Workshop Act of 1895 is perhaps the earliest act in any country requiring the reporting of anthrax as an occupational disease. This was later superseded by section 79 of the British Factory and Workshop Act of 1901. Most countries now have regulations requiring the notification of cases of anthrax, under the penalty of law, to the appropriate authorities.

Symptoms

CUTANEOUS anthrax starts as a small red papule or lesion usually on an exposed part of the body. The most frequent places for the papule are hands, wrists, forearms, face and neck, usually at points where there is friction. Case histories of 25 consecutive cases of skin anthrax reported by Ellington *et al* appear to suggest that the anthrax papule is most likely to occur at the point of a previous burn or trauma.[9] A striking feature of the skin infection is the absence of pain in the lesion, especialy during the first one or two days. To the patient, the pustule seems harmless when he first notices it, although in some cases the region around the lesion has been known to be affected by itching and a burning sensation. On the third or fourth day, the lymphatic glands around the pustule are usually swollen and painful. The lesion, then, has a blister indented in the center, which turns black, opens out, and discharges a bloody fluid. The infection is accompanied by high fever, headache, and general discomfort to the patient.

Internal anthrax, which is the most dangerous form, is due to the inhaling of spores, or to ingestion of spores with food and tobacco, or by swallowing. No pustule might appear on the skin in this case. Internal anthrax is difficult to diagnose and often misleading. Since it is a rare disease, the ordinary medical practitioner has little experience with it. On this account, many patients die because the doctor does not suspect anthrax infection in the early stages. The symptoms of internal anthrax closely resemble those of pneumonia, influenza, bronchitis, or rheumatism. Bacteriological verification is therefore necessary; this, unfortunately, is not available in every case.

Treatment

FACILITIES for the treatment of anthrax in the United States until about 30 years ago were in a tragic state. Many hospitals refused to accept anthrax-infected patients on the plea that they were not equipped for treating this disease.[10] In many districts, the serum was not

readily available when anthrax was detected.

The treatment about 30 years ago consisted of incision and phenol injections. This was not a satisfactory treatment, as fatalities amounted to somewhere from 30 to 60% of the cases treated.[11] Later on, treatment with anti-anthrax serum (local and intravenous) was developed. This also did not prove satisfactory. Moreover, it caused serum sickness and sharp reaction in the patient. Subsequently, arsenical drugs and sulfanomides (particularly sulfathiazoles) were tried and these proved to be more successful than anti-anthrax serum. These drugs are still used by some doctors for the treatment of anthrax.

The use of penicillin for the treatment of anthrax was suggested in the year 1941 and many doctors have reported favorably about it. Ellington *et al* have also reported successful recovery of all the 25 patients treated with penicillin in doses varying from a total of one million to over four million units for each patient. These doctors have suggested that penicillin be given further clinical trial in the treatment of anthrax.[12]

Clerke, the Chief Medical Officer of the Tingri Medical Association, India, has reported successful results from the use of chloromycetin administered to four patients, all members of the same family, at one time. For the sake of comparison, another patient, also a member of the same family, who had arrived at the hospital along with the other four, was treated with penicillin, sulfathiazole, and arsenic drugs along the traditional lines. This patient died within seven hours after reaching the hospital. Another patient who arrived at the same hospital a month later, suffering from anthrax infection, recovered after treatment with chloromycetin.[13]

Annual reports of the British Chief Inspector of Factories for the years 1950 and 1952 indicate that aureomycin has been used successfully in some cases for the treatment of some severe cases of anthrax in Great Britain.

While sulfa drugs and penicillin do help in the recovery of many patients infected with anthrax, these drugs also fail in some cases. Sufficient trial has not yet been given to the use of chloromycetin and aureomycin for the treatment of anthrax. It appears that the whole subject of treatment of anthrax-infected patients deserves further study. Unfortunately, countries in Asia and Africa, where the disease usually originates, and where the values of the various drugs could be put to test, do not have enough trained doctors in the rural districts who can identify the disease and study the responses of patients to the various drugs.

Whatever the form of treatment, promptness and rigorousness are essential to recovery. It is also necessary to keep the patient at bed rest during the acute phase of the infection and to immobilize the affected parts of his body.

Prevention

CONTROLLING IMPORTS: As far as the importing countries are concerned, judicious buying of wool, hides, bristles, etc., from countries known to be free from anthrax is the best way of controlling this disease. However, owing to the economic implications, this solution is not always possible. Hence an effective way of eliminating or reducing the incidence of anthrax is to disinfect all imported material which is likely to be infected with anthrax spores.

Disinfecting Imports: In order to deal effectively with anthrax-infected material imported into the country, it is necessary to centralize all imports at one port of entry and to equip this port with a disinfecting station for disinfecting all potentially infected wool, bristles, and hair, under controlled conditions. At present, most of the wool and hair imported into the United States arrives at New York, Philadelphia, and Boston. It is estimated that if all the potentially infected material imported into the United States is disinfected, it will be necessary to disinfect about 60 million pounds per year.[14]

Great Britain established a centralized disinfecting station at Liverpool in 1921 at a cost of $280,000.[15] Since the end of World War II, this station has been enlarged by incurring an additional expenditure of about $420,000 and has now a capacity for disinfecting about eight million pounds of raw wool per year on single shift work. The fee for disinfection is charged to the importers, the present rate being approximately three cents per pound of raw material treated. The income from fees is normally sufficient to meet the cost of running the disinfecting station, including the overhead charges.

The following is a brief account of the disinfecting process in use at Liverpool (quoted from a recent letter received from the H. M. Deputy Chief Inspector of Factories, London):

"Stage 1: Hydraulically pressed bales as imported are placed on the moving platform of a feeding machine and the steel bands and canvas covers removed. The material travels on the platform into the machine, where it is opened and delivered into the first process machine.

"Stage 2: In the first process machine it is submitted for 10 minutes to the action of a dilute alkaline solution at 102°F in order to remove the albuminous matters by which the anthrax spores are protected. It is then squeezed through rollers and delivered into the second process machine.

"Stage 3: The material is here acted on for 10 minutes by a dilute alkaline soap solution at 102°F, the purpose being to promote a condition of the spores in which they can be killed with comparative ease. This stage is essential to the process and it possesses the advantage that it also cleanses the material. It then passes through rollers into stage 4.

"Stage 4: In this stage the actual disinfection is carried out, the material passing through two successive baths (with rollers between), the first containing a 2% solution of formaldehyde, and the second a 1.83% solution of formaldehyde, both at a temperature of 106°F.

"Stage 5: The material then passes through rollers into a bath through which clean water is continuously being pumped and kept at a temperature of 102°F. The object of this bath is to remove excess formaldehyde from the disinfected hair,

and the strength of this bowl is not allowed to exceed 0.25% concentration.

"Stage 6: The material then passes through rollers and is blown by hot air into the drying machine from which it is discharged into the cooling machine (Stage 7). The cold air blows the material into the charging box of the baling machine where the material is baled into hard-pressed bales of about 370 pounds (Stage 8).

"The material remains 10 minutes in each process bath and 20 minutes in the dryer and cooler, and the process of disinfection from opening a bale to rebaling occupies something like one and a half hours. In order to safeguard the workmen, overalls are provided for their use, and these are sterilized weekly. Good lavatory accommodation, with hot showers and baths, is provided.

"The two machines containing the formaldehyde solution are completely enclosed in glass frames and when these have to be entered for small repairs or re-wrapping of rollers, the workers are provided with gas masks which effectively protect them from the fumes. The raw material is sometimes very dusty and dirty. The feeding and opening machine is therefore provided with an exhaust fan by means of which the dust is conveyed into a filter and from thence by means of another fan it is blown into the furnaces of the boiler in use. It can also be diverted direct into the chimney stack if desired."

There is no known economically satisfactory method for disinfecting hides and skins which does not damage the product.

Preventive Measures

WOLFF and Heimann, after comparing the figures relating to the incidence of anthrax in the wool apparel and wool carpet industries in the United States, have concluded that there is more incidence of anthrax in the wool carpet industry using coarse wool than in the wool apparel industry using fine wool. The reason is that Great Britain, Australia, and South Africa, by using modern methods of breeding and animal husbandry, are able to produce fine wool and at the same time prevent anthrax infection.

Coarse wool is generally produced in countries like China, India, Pakistan, North Africa, regions of Western Asia, and Southern Europe, as modern methods of animal husbandry are not used in these countries. Consequently, the incidence of anthrax is also great in these countries.[16] More precautions therefore should be taken in the wool carpet industry than in the wool apparel industry.

The following measures for preventing the outbreaks of anthrax and for controlling the spread of the infection are suggested:

1. Farmers, sheepmen, and cattle handlers in all countries should be educated (if necessary through the village officers' publicity departments) to report outbreaks of anthrax promptly to the nearest veterinary department and to segregate the infected animals.

2. Change of pasture after the detection of anthrax infection has been known to be responsible for preventing heavy losses due to anthrax. If the outbreak occurs during the fly season, livestock should be moved out at night so that the infection-spreading flies are left behind.

3. All animals in the infected area should be given prophylactic inoculations. It is also a good practice to give inoculations to the animals just before the anticipated commencement of every anthrax season, where such seasons occur regularly.

4. Checking the breeding of flies and insects by spraying DDT and by other means will also help in checking the spread of anthrax.

5. Carcasses of animals dying of anthrax should either be buried under a layer of quicklime, at least six feet deep, or cremated in the open away from habitable places. All places likely to have been contaminated with discharges from anthrax-infected animals should be thoroughly disinfected.

6. No autopsy of animals which are suspected to have died of anthrax should be permitted.

7. Hides and skins should be opened only under mechanical exhaust ventilation and all dust collected in a receiver and incinerated. Workers in the opening departments should be provided with suitable respirators.

8. All wrapping material removed from bales in which the infected material is likely to have been received should either be disinfected or incinerated.

9. Proper sanitary precautions should be observed in establishments where animal products are handled. Floors, walls, stairways, elevators, etc., of such establishments should be lined with impervious and smooth surfaces so they can be easily cleaned by wet mopping and vacuum cleaning. Cleaning should be done daily.

10. Adequate washing facilities, with constant supply of warm and cold water, soap, nail brushes, and towels (which should be renewed daily), and locker rooms should be provided for workers in places where animal products are handled. Street clothes of workers should be kept separate from work clothes.

11. Dining rooms should be located outside the work rooms, and should be separated therefrom and from all other rooms where infection is likely to be present.

12. Workers should be educated in the use of protective clothing, personal hygiene (this should include washing hands, arms, face, and neck thoroughly after each spell of work and before eating; washing head daily, and keeping fingernails short and clean), and good housekeeping. Protective clothing should consist of loose-fitting coveralls with long sleeves and collars, and hats. In wet operations, impervious boots and aprons should be provided.

13. Workers should be instructed, and constantly reminded (by means of posters and other publicity methods) to report the smallest of lesions. Even razor cuts on the face or neck and chapped hands are a source of danger. Skin sores and infections should be promptly treated. Supervisors should be alert and on guard to see

that the workers do not neglect these instructions for personal protection.

Summary

THE NATURE of anthrax and the means by which it spreads have been pointed out. Aspects of agricultural and industrial anthrax have been discussed. Symptoms, and treatment—which has changed over a number of years—have been mentioned. Methods for preventing anthrax infection and reducing the hazard to which industrial workers are exposed have been briefly dealt with.

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The Carcinostatic Action of Hydrocarbons

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AN EARLIER survey directed attention to the anticancer action of hydrocarbons against transplanted tumors and induced skin and liver cancers in animals.[9] Further research has developed the carcinostatic action of hydrocarbons against all three types of neoplasms.

Leiter and associates[4] studied the damage induced in Sarcoma 37 by biphenyl, fluorene, phenanthrene and tropolone derivatives. They reported five phenanthrenes and three tropolones as active. Haranghy and co-workers,[2] inhibited implanted round-cell sarcomas in rats by injections of dibenzanthracene (DBA). Foley[1] noted that 20-methylcholanthrene (MC) induced sarcomas, which regressed following ligation, caused mice to be immune to further MC administration.

Hill *et al*[3] showed that, with a fixed concentration of dimethylbenzanthracene (DMBA), increasing the concentration of MC up to a critical point delayed skin tumor formation, but that beyond this the latent period was shortened and approached that of DMBA alone. But the weak carcinogen 8-methyl-1,2-benzanthracene increased the latent period constantly.

E. C. Miller and associates[6] have continued their study of the mechanism of inhibition of 3'-methyl-dimethylaminoazobenzene liver tumors in rats by the action of the strong carcinogen, MC. Meechan *et al*[5] noted that 3-methylcholanthrene prevented hepatic tumors by the same azo dye if added in the diet before the sixth week, and that there was partial inhibition when the hydrocarbon was added before the tenth week.

J. A. Miller and co-workers[7] have described the strong inhibition of 2-acetylaminofluorene (AAF) and 7-fluoroacetylaminofluorene tumors in rats given MC. Miyaji *et al*[8] noted the carcinostatic action of three hydrocarbons, MC, DMBA, and chrysene, against AAF-induced tumors in rats.

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The Present Status of Silicone Protective Creams

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IN MANY types of industrial operations there is an apparent need for a cream or ointment which will afford cutaneous protection against irritants, sensitizers and other substances hazardous to the skin.

There is a great deal of skepticism on the part of industrial physicians, hygienists and even dermatologists regarding the usefulness of such a measure. The skepticism is justified for several reasons. In the past, a variety of formulae have been described which included simple vanishing creams containing soaps, resinous films which were reputed to be either water insoluble or soluble, "pore-filling" greases, etc. These have been, and are still, huckstered with fantastic promises as to what can be expected of them—and are frequently purchased without requiring objective evidence of their efficacy. Observant medical personnel have been quick to learn that the protective value of many commercial formulations is very limited; that the duration of protection, if any, is short; that a single formulation is ineffective against both aqueous and oil soluble hazards; that in many instances the greatest source of protection is afforded by the washing schedule which is suggested prior to and after using the cream—several times per day.

A few years ago, protective formulations were introduced containing silicone of the dimethylsiloxane type. In laboratory and clinical investigations, several of them gave genuine promise of protective properties against specific chemicals.[1-6]

Our own experience with the silicone protectants has included a systematic industrial and laboratory study of one preparation,[1] individual clinical trials with three formulations, and laboratory examination of the comparative stability of films of four formulations.

There is good reason to believe that the clinical protection afforded by a silicone formulation depends on its ability to provide an intact film which will repel or be relatively unaffected by specific chemical substances throughout the period of exposure. The efficacy of the repellent action is determined by (1) the physical and chemical properties of the silicone fluid, (2) the concentration of silicone, (3) the nature of the vehicle and its ability to make a uniformly repellent mixture with the silicone, and (4) the manner and schedule of application.

The results of an industrial appraisal of one preparation, containing 52.5% silicone and bentonite (Pro-Derna) have been reported previously.[1] The major part of that study was conducted at an aircraft engine plant. The formulation was made available to employees of five departments in which there was a significant amount of dermatitis. Forty-four of 114 persons had some occupational skin complaint prior to the introduction of the cream. In 24 of these, or 54.5%, the dermatitis did not recur following the introduction of the cream. The cream was used for three months, or longer, and the subjects were re-examined periodically during the trial period. Employment of the silicone formulation appeared to prevent the recurrence of the symptoms in all of the workers (14 cases) whose dermatitis resulted from exposure to a corrosion inhibitor containing phenylethanolamine. It worked equally well against the irritation caused by light turbine oils. It was effective in 75% of the cases where cutaneous lesions resulted from insoluble cutting oils and in 86% of the cases attributed to soluble cutting fluids. It did not prevent recurrence of dermatitis in 10 persons whose hands were immersed in kerosene and had no effect against the cutaneous irritation caused by sodium silicate.

In the laboratory a simple method was devised in which films of the cream on standard micro slides were immersed for 24 hours in certain common irritants, as well as to those substances to which the subjects were exposed.[1] With a few exceptions we have observed very good correlation between our *in vitro* and clinical observations in comparable situations.

The same laboratory method may be used to measure the relative efficacy or repellency of several formulations in a specific exposure. The results of 24-hour slide immersion tests comparing four formulations are given in Table I. They indicate the comparative stability of films of the four ointments when exposed to commonly used petroleum fractions, polar solvents, water, usage concentrations of hand soap, laundry soap and laundry synthetic detergents, soluble cutting

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fluids, cutting oils, formaldehyde, phenol, aqueous solutions of mineral acids, alkalis and salts which may be irritating to the skin.

Occupational Problems

IN WHICH specific occupational situation can silicone creams be used? We have already pointed out that the silicone-bentonite formula may be used effectively to prevent dermatoses resulting from organic corrosion inhibitors, turbine oils, insoluble and soluble coolants. It will also prevent irritation by mineral acids or alkalis, alkaline cleansing agents, and bleaches. Through its use men have been enabled to return to their original jobs despite their hypersensitivity to chromates, nickel, tincture of opium, salts of para-aminobenzoic acid, formaldehyde, phenol-formaldehyde plastics, epoxy plastics, and the

TABLE I.
COMPARATIVE STABILITY OF FOUR SILICONE CREAMS
RESULT OF FILM IMMERSION TEST

		Percent of Film Removed									
Cream	Duration of Immersion	Gasoline	Kerosene	Turpentine	Trichloro-ethylene	Petroleum Ether	Mineral Spirits	Ethyl Alcohol (abs)	Acetone	Tap Water	White Toilet Soap (1%)
Covicone (1)	5 min.	0	50	10	20	5	30	100	90	50	0
	20 min.	0	50	10	20	50	80		100	90	sm.amt.
	1 hr.	20	50	10	50	50	95			95	sm.amt.
	3 hrs.	40	50	30	50	50	95			95	sm.amt.
	6 hrs.	40	70	30	50	50	100			95	10
	24 hrs.	40	70	30	50	50				95	95
Domicone (2)	5 min.	30	50	75	50	10	100	20	90	100	0
	20 min.	30	50	75	50	50		100	95		0
	1 hr.	30	50	90	50	50			95		0
	3 hrs.	30	75	100	80	50			100		0
	6 hrs.	50	90		100	50					sm.amt.
	24 hrs.	75	90			50					20
Pro-Derma (3)	5 min.	50	80	100	100	50	60	0	100	0	0
	20 min.	50	80			50	70	0		0	0
	1 hr.	50	80			50	90	0		0	0
	3 hrs.	60	90			50	100	0		0	5
	6 hrs.	80	90			50		0		0	5
	24 hrs.	80	90			100		60		0	5
Silicote (4)	5 min.	90	90	90	100	100	100	0	0	0	0
	20 min.	100	100	100				0	0	0	0
	1 hr.							0	0	0	0
	3 hrs.							0	sm.amt.	0	0
	6 hrs.							0	sm.amt.	0	0
	24 hrs.							0	sm.amt.	10	0

		Percent of Film Removed								
Cream	Duration of Immersion	"Built" Laundry Soap (1%)	Laundry Detergent Containing Aryl Alkyl Sulfonate (1%)	Lusol	Cimcool	Turbine Oil (1005)	Cut-Max #31	Formalin (100%)	Phenol (10%)	$K_2Cr_2O_7$ (13%)
Covicone (1)	5 min.	0	30	sm.amt.	50	50	25	sm.amt.	100	0
	20 min.	sm.amt.	90	sm.amt.	100	75	25	5		0
	1 hr.	20	100	sm.amt.		75	25	10		0
	3 hrs.	90		5		90	50	70		0
	6 hrs.	100		5		98	50	70		0
	24 hrs.			5		98	50	70		5
Domicone (2)	5 min.	0	0	0	0	30	0	0	100	0
	20 min.	0	0	0	0	80	30	50		0
	1 hr.	0	85	0	100	80	30	100		0
	3 hrs.	5	100	0		90	50			0
	6 hrs.	5		5		95	70			5
	24 hrs.	5		5		95	70			5
Pro-Derma (3)	5 min.	0	5	0	0	sm.amt.	0	0	0	0
	20 min.	0	5	0	0	sm.amt.	0	0	0	0
	1 hr.	0	10	0	0	sm.amt.	0	0	0	0
	3 hrs.	0	20	0	0	sm.amt.	0	0	0	0
	6 hrs.	0	20	0	0	10	0	0	10	0
	24 hrs.	Very sm.amt.	50	0	0	10	0	0	50	0
Silicote (4)	5 min.	0	0	0	0	0	0	0	0	0
	20 min.	sm.amt.	0	0	0	90	0	0	0	0
	1 hr.	sm.amt.	0	0	0	100	90	0	0	0
	3 hrs.	10	0	0	0		100	0	0	0
	6 hrs.	10	0	0	0			0	0	5
	24 hrs.	10	0	sm.amt.	0			0	0	10

(1) Covicone contained 2% silicone fluid in a mixture of nitrocellulose and castor oil in vanishing cream base.
(2) Domicone contained 20% silicone fluid in a water washable base.
(3) Pro-Derma contained 52.5% silicone fluid mixed with bentonite.
(4) Silicote contained 30% silicone fluid in a white petrolatum vehicle.

TABLE I—CONTINUED
COMPARATIVE STABILITY OF SILICONE CREAMS
RESULT OF FILM IMMERSION TEST

Cream	Duration of Immersion	Percent of Film Removed								
		$ZnCl_2$ (25%)	HNO_2 (1%)	HNO_3 (69%)	NaOH (10%)	HCl (1%)	HCl (30%)	H_2SO_4 (1%)	H_2SO_4 (30%)	NH_4OH (27%)
Covicone (1)	5 min.	5	0	5	100	0	0	5	0	100
	20 min.	5	sm.amt.	5		sm.amt.	sm.amt.	5	5	
	1 hr.	5	sm.amt.	20		sm.amt.	sm.amt.	5	5	
	3 hrs.	5	sm.amt.	20		sm.amt.	sm.amt.	5	5	
	6 hrs.	5	sm.amt.	20		sm.amt.	sm.amt.	5	5	
	24 hrs.	5	sm.amt.	20		sm.amt.	sm.amt.	5	5	
Domicone (2)	5 min.	0	sm.amt.	20	50	0	0	0	0	10
	20 min.	0	sm.amt.	20	50	sm.amt.	0	0	sm.amt.	100
	1 hr.	0	sm.amt.	20	50	sm.amt.	0	0	sm.amt.	
	3 hrs.	0	20	20	100	sm.amt.	0	0	sm.amt.	
	6 hrs.	0	20	20		sm.amt.	0	0	sm.amt.	
	24 hrs.	5	70	20		sm.amt.	0	50	sm.amt.	
Pro-Derna (3)	5 min.	0	0	0	30	10	0	0	0	0
	20 min.	0	0	0	50	20	0	0	0	0
	1 hr.	0	0	0	50	25	0	0	0	0
	3 hrs.	0	0	0	50	25	0	0	0	0
	6 hrs.	0	50	0	75	25	0	10	0	0
	24 hrs.	0	50	0	90	50	0	50	0	0
Silicote (4)	5 min.	0	0	0	0	sm.amt.	0	0	10	0
	20 min.	0	0	0	sm.amt.	sm.amt.	0	0	10	0
	1 hr.	0	0	0	5	sm.amt.	0	0	10	0
	3 hrs.	0	0	0	10	sm.amt.	0	0	10	0
	6 hrs.	0	0	0	10	sm.amt.	0	0	10	0
	24 hrs.	0	0	0	10	sm.amt.	0	5	10	0

(1) Covicone contained 2% silicone fluid in a mixture of nitrocellulose and castor oil in vanishing cream base.
(2) Domicone contained 20% silicone fluid in a water washable base.
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(4) Silicote contained 30% silicone fluid in a white petrolatum vehicle.

orange and yellow dyes used to color oranges and lemons.

How do the various silicone creams differ in their effectiveness? In our experience the formulation containing 52.5% silicone in bentonite (Pro-Derna), and that containing 30% silicone in petrolatum (Silicote), are both effective against a wide range of aqueous irritants or sensitizers including mineral acids, alkalis, salts, formaldehyde, soluble machine coolants, and some alcohols. The silicone-bentonite mixture, Pro-Derna, is effective against heavy mineral oils (as in cutting oils), while the petrolatum mixture, Silicote, is not. The plasticized mixture of nitrocellulose, castor oil and 2% silicone (Covicone) has a limited range of effectiveness. It cannot be regarded as a silicone protectant since its silicone content is so meager. The latter is not as effective against some alkalis, alcohols and water-soluble coolants as are the first two formulations. Shaw,[6] in comparative tests against soap and water and a water-soluble coolant, observed that Covicone remained on the hands only as long as vanishing cream. None of the creams is effective against petroleum fractions in the low boiling range such as gasoline, mineral spirits, stoddard solvent and kerosene.

Pro-Derna, Domicone and Covicone are readily removed by most commercially available synthetic detergents applied with a little scrubbing. Silicote is not so readily removed by detergents. Both Silicote and Pro-Derna will withstand some limited immersion in solutions of toilet soap, as well as of "built" laundry soaps. Pro-Derna will repel high boiling catalytically cracked petroleum fractions. This may prove useful in refining operations in which workers come into contact with fractions which are carcinogenic.

It should be emphasized that the present silicone creams are not therapeutic agents, but should be used strictly as prophylactic devices. They should not be applied to severely or even moderately inflamed skin. In inflammatory reactions related to contactants, the creams may be used effectively following the regression of the acute phase. We have found the silicone-bentonite combination useful in prevention of cutting oil folliculitis when applied following the scrubbing of the exposed areas with a detergent. In the treatment of an eczematous contact dermatitis, the patient may be returned successfully to a job if the hygienic regimen includes the use of a silicone cream, providing the offending substance is repelled by the cream. In industrial operations which are hazardous to the skin, the routine use of the cream will, in specific instances, decrease the incidence of cutaneous reactions.

If some silicone creams can do all of these things for the prevention of occupational skin problems, why haven't they caught on? There are several very important reasons why they have not. To begin with, the first preparation which contains 30% silicone in petrolatum, was brought out with little fanfare and limited sales promotion. This was followed by the widespread distribution of a cream containing 2% silicone which, as indicated previously, has limited effectiveness. Supplies of the latter were available for clinical trials, and physicians were disappointed in the results. For many of them this was their first experience with a cream containing silicone. Failure to achieve the expected results

with this preparation has influenced the physicians' attitude toward the use of other formulations.

Another factor is cost. Creams containing 30% or 52% silicone are much more expensive than so-called protectants which do not contain silicone. Even when purchased in volume the cost of the silicone cream may be five to 10 times that of the non-silicone preparation. There is also the factor of cosmetic acceptance to be considered. Some workers object to the greasiness of Silicote. When a heavy coat of Pro-Derma is applied, the skin surface becomes "tacky." The general attitude of the employee regarding the ineffectiveness of previously used creams, and the reaction that creams are a nuisance to apply, has also been carried over to the silicones.

Despite the peculiar circumstances which accompanied the introduction of silicone creams, their cost, and the previously acquired prejudices regarding creams in general, silicone formulations appear to show great promise in dermatologic prophylaxis. With further development work on the part of the producers of silicones, the factors of cost, cosmetic acceptance and range of repellency may be overcome.

As for the presently available silicone creams, it is essential to understand that none of the available formulations is a universal repellent. The usefulness of each for specific purposes can only be determined by careful clinical and laboratory investigation. The physician should use the results of such investigations as his guide in prescribing a particular formulation.

ACKNOWLEDGMENTS: The protectants employed in this investigation were supplied as follows: Covicum by Abbott Laboratories, North Chicago, Illinois; Dermicone by Dome Chemicals, Inc., New York 23, New York; Pro-Derma by Westwood Pharmaceuticals, Buffalo, New York; and Silicote by Arnar-Stone Laboratories, Inc., Evanston, Illinois.

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"Idea Cafeteria"

IN RECENT years American employers—in government and out—have done an exceptionally good job of taking care of their employees' physical needs, but they have neglected one especially important thing. They have seen to it that their employees are well-fed in employee cafeterias, well cared for by safety and medical departments, well exercised by recreation programs, and even their old age well cushioned with pension programs. But only a handful have realized that their employees' bodies have a head, too, and that their thinking affects the climate in which all employers, public as well as private, must operate. For in spite of Medical Departments, safety programs, and subsidized cafeterias—in spite of top efficiency, maximum production, good wages, excellent policies, and all the rest—if the country starts to sink into a crippling depression or if it follows the path of British socialism, guided by misinformed citizen-employees, revenues will drop off, budgets will be cut, lay-offs will be forced, and all the wonderfully efficient plans, policies, and programs will be knocked into a cocked hat. . . . In 1948 General Motors Corporation developed, on an experimental basis, a new plan for reaching the minds of employees. They called it "an idea cafeteria for offering mental and spiritual nourishment to employees." Now it is called an information rack program. Briefly, an information rack program is simply an organized method of feeding an employee's normal hunger for knowledge through a continual flow of attractive booklets on a wide variety of subjects. It is designed to help readers become healthier, happier individuals, more loyal and intelligent citizens, and more interested and efficient employees. . . . Today, just five years since the idea was first formulated, over 1,500 organizations are distributing through information racks an estimated four million booklets a month to their employees. General Motors alone has distributed 85 million copies of over 421 different booklets since the inception of its now famous experiment.

From "A New Line of Employee Communication" by Robert E. Altmaier, of Good Reading Rack Service, New York, in Personnel Administration, May, 1955.

Presenteeism—A Constructive View

GRANT W. CANFIELD, Personnel Manager
Aircraft Division, Rheem Manufacturing Company
DAVID G. SOASH, Executive Vice-President
Electronic Counter Laboratories, Inc.
Los Angeles

WHILE the absence problem has long been recognized, business firms have not had reliable information on normal levels of absenteeism. It may be that this lack of knowledge of industry or area rates has hampered effective analysis and control of absenteeism and its attendant cost.

To remedy this situation in our area, the Merchants and Manufacturers Association of Los Angeles undertook a one-month survey to obtain absentee statistics which might be used by employers in the development of their control programs. Our aim was to help companies deal with the problem constructively—to help them work *towards presenteeism* rather than *away from absenteeism*.

We believe that this survey was the largest ever conducted in a single community on absenteeism: 219 firms participated, representing a cross section of industry in the highly diversified Los Angeles metropolitan area. The companies ranged in size from 20 to over 30,000 employees. All kept a daily record of absences for one month, and many told us about the methods they use to control absenteeism.

Absences *included* in the tally were those of over four hours in any one day, whether authorized or unauthorized. Specifically *excluded* were those of less than four hours, and those due to industrial accidents, authorized leaves of absence, and vacations. Our absentee rates are based on the number of man-days lost by individual absences as defined above, divided by the total potential man-days available.

The survey showed an over-all absentee rate of 2.8% for the month. When the exempt salaried employees (managerial, professional, and technical) were omitted from the count, the rate became an even 3%.

The following table shows a breakdown of the absence rates according to industry group, pay class, sex, and shift. The terms "exempt" and "non-exempt" refer to definitions in the Federal Wage and Hour law. It should also be noted that the "hourly paid" group excludes hourly-paid office employees who have been reported under the "salary non-exempt" heading.

As expected, the survey showed that absentee rates for the night shifts (second and third shifts) were generally higher than for the day shift, with the third (graveyard) showing the poorest record of the three shifts.

This general pattern held true for both male and female employees and for the hourly-paid as well as for non-exempt salaried employees. However, it was noted that the difference between the day shift and night shift absentee rates among female office employees (non-exempt) was much more pronounced than among female hourly paid (non-office) personnel. Female non-office absenteeism varies from 3.9 on the day shift, to 4.1 on the second shift, and 4.5 on the third shift. On the other hand, female office employees had a lower 3.2 rate for the day shift, registered a similar 4.1 for the second shift, but reached a much higher 5.3 rate for the third shift.

Generally speaking, the absentee rates for "non-exempt" office employees were lower than for "hourly" shop employees and, as might be anticipated, the managerial, professional, and technical "exempt" had the best record among the three employee groups. In support of another widely accepted assumption, absence rates among female employees were found to be generally higher than among males.

Confirming the results of other smaller studies, the survey showed Monday to be the day of most frequent absences, with a rate of 3.3%. Wednesday and Thursday, with rates of 2.6%, were the days with the best attendance. The rate for Tuesday and Friday absences was 2.8%. If it were not for the fact that Friday is payday for the majority of hourly paid employees, it probably would have shared the poor showing of Monday as a day of heavy absence. To measure the effect of paydays on absenteeism, a separate calculation was made of the Monday absence rate among firms that pay their hourly employees on that day. The rate for this group was 2.6% in comparison with the previously mentioned 3.3% for the whole group on Mondays.

The survey period included a holiday, so that the effects of company policies requiring attendance before and after the holiday in order to become eligible for holiday pay could be measured. The value of this practice was supported by the survey, which showed a 1.9% absentee rate on the day before the holiday for those firms requiring employee attendance on that day in order to receive holiday pay, as compared with 2.3% rate for those not having this requirement. Consistent with this finding is the absence rate of 2% on the day after the holiday for those requiring work on that day, versus 3.6% for those firms who did not require attendance in order to receive holiday pay.

It is interesting to note that although the combined absentee rate for the day before the holiday (a Wednesday) was lower (2.2%) than the average for that day of the week (2.6%), the rate for the day after (a Friday) was higher (3.3%) than was usual for that day (2.8%).

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PERCENTAGE ABSENCE RATES FOR SURVEY MONTH

Industry	Combined Absence Rate (Excluding Exempt)	Hourly Paid		Salary Non-exempt		Salary Exempt		Shifts		
		Male	Female	Male	Female	Male	Female	Day	Second	Third
Food and Kindred Products	2.4	1.6	3.7	2.0	1.8	0.5	*	2.4	2.9	*
Furniture and Fixtures	2.9	2.9	3.3	1.2	1.9	0.4	0.7	2.7	*	*
Paper and Allied Products	2.5	2.3	3.1	0.7	3.8	1.0	*	2.5	2.2	*
Chemicals and Allied Products	2.5	2.2	3.8	1.9	2.9	1.3	0.8	2.6	1.2	*
Rubber Products	1.5	1.5	4.5	1.5	*	0.8	*	1.3	1.9	2.3
Stone, Clay and Glass Products	1.7	1.6	6.3	4.2	1.4	0.0	*	2.2	*	*
Primary Metal Industries	3.3	3.5	4.4	1.0	2.5	1.4	2.4	3.0	4.1	5.8
Fabricated Metal Products	2.6	2.7	3.1	0.8	1.8	0.8	0.2	2.5	3.0	3.4
Machinery (Except Electrical)	2.7	2.8	3.3	1.3	3.6	1.0	0.5	2.6	3.3	5.9
Electrical Machinery, Equipment and Supplies	2.8	2.1	3.8	1.2	2.6	1.2	0.0	2.6	2.9	4.1
Transportation Equipment	3.3	3.2	4.6	2.4	3.1	1.4	2.3	3.1	4.1	4.6
Instruments and Related Products	2.7	2.4	4.1	1.3	2.8	2.3	1.9	2.8	2.9	*
Miscellaneous Manufacturing	2.4	2.7	2.0	1.3	1.5	0.0	*	2.4	2.9	*
Merchant Wholesalers	2.5	2.6	5.4	1.4	2.9	1.0	1.9	2.5	4.5	*
Other Wholesalers	2.8	3.1	1.6	1.1	3.8	0.7	*	2.9	*	*
Banking	2.4	*	*	1.5	2.6	0.4	1.2	2.4	*	*
Insurance Carriers	3.3	0.4	0.4	1.7	3.8	1.2	2.4	3.0	*	*

*Insufficient data

dustry amounts to approximately $125 per employee per year. In arriving at this estimate, the 3% absentee rate indicated by the survey was used. The costs of an employer-paid sick leave program providing six days paid sick leave was also used, since a majority of employees were covered by this type of plan. We also assumed normal manufacturing direct-labor forecasting and scheduling factors.

During the course of this study certain effective means of controlling absences were observed. Most of the direct, short-term methods are reasonably well known. These include:

1. Development of a company policy on the subject.
2. An adequate records system.
3. Medical clearance for returning absentees.
4. Investigation of unauthorized absences by telephone or home visits.
5. Clearer employee understanding of company absence rules and reprimand procedures.
6. Counseling of chronic absentees regardless of type of absence.

In addition to these control procedures, certain other things were observed that influence absence levels. Attention to these things might be called "preventive control." In the long run, this may lead to the development of the constructive idea of "presenteeism" previously mentioned. Some elements to be considered are these:

A. *Ineffective selection and placement procedures*—These usually are considered to be at the root of most personnel problems, and certainly are with respect to absenteeism. Except during depressions or recessions, employees who are mismatched to their jobs are much more prone to be absent than those who have been properly selected and placed on the job. Careful attention to selection procedures is perhaps the most important single step in correcting the absentee problem.

B. *Excessive industrial fatigue*—Extended workweek schedules lasting over several weeks have been found to result in higher rates of absenteeism. Of course, the type of work involved is also to be considered under this heading. In unusually heavy or hazardous work, periodic physical checkups may be indicated.

C. *Over-staffing and under-staffing*—Although over-staffed conditions may be welcomed by some of the lazier employees, it is more often a cause of concern. Employees working under such circumstances may lose their feeling of security, believing that management will sooner or later discover the situation and that terminations will result. Employees may also develop a lack of confidence in their management, resulting in a lowering of morale and an increase in absenteeism. Under-staffing and the resultant overburdening of employees, if not soon remedied, will also bring about a loss of confidence in management, excessive industrial fatigue and an inevitable rise in the number of absences.

D. *Irregular flow of production*—This may cause intermittent over-staffing and understaffing with the same results.

E. *Other morale factors*—Simply stated, anything that affects morale will have a bearing on the level of absenteeism. Poor supervision, an inadequate training program, ineffective grievance procedure, unpleasant working conditions, are among the things which may exercise an adverse effect upon morale and result in increased absenteeism.

Although the above "in-company" causes of absenteeism may be more readily identified and handled, they are certainly not the only elements to consider. The "external" causes may be classified in two groups: "community" and "personal."

The following are among the community causes of absenteeism: (a) inadequate housing; (b) shopping problems; (c) poor transportation; (d) lack of home service (laundry, banking, etc.); (e) lack of child-care facilities.

Among the personal causes are: (a) illness of self or family; (b) accidents to self or family; (c) household duties; (d) recreation, child care, etc.; (e) seeking other employment.

It is apparent that absenteeism costs money. The fact that absences frequently indicate a morale problem suggests careful management attention to this subject. Since absence control or "presenteeism" is generally the responsibility of personnel administration, it is one more frontier where the personnel director may produce savings that can be readily measured by management.

Industrial Medicine's Hall of Fame

PERCIVAL POTT, F.R.S.

Surgeon, St. Bartholomews Hospital, London

A SHORT BIOGRAPHY, WITH A REPRODUCED CHAPTER FROM HIS CLASSIC WORK, CHIMNEY SWEEPS' CANCER

Prepared by ROBERT T. LEGGE, M.D., Berkeley, California

IN MY LIBRARY recently, I opened Volume 3 of the last edition of the Chirurgical Works of Percival Pott, the master surgeon to Saint Bartholomews Hospital, London, which was published in 1783, three years before his death. In this volume is his classic work on Chimney Sweeps' Cancer of the scrotum, which derives its origin from the lodgment of soot in the rugae of the scrotum developing an initial wart-like tumor. This eighteenth century observation and description of this early occupational disease is of historical interest to industrial physicians, surgeons, and investigators in cancer research. The name of Percival Pott ranks as one of the immortals in occupational medicine. It is fitting for our Hall of Fame, that his original classic chapter on cancer of the scrotum be reproduced, with his biography and portrait. —RTL

Percival Pott (1714-1788)

PERCIVAL POTT was born in London, January 6, 1714. While in his infancy his father died. As a child he was reared and educated by his mother and relatives, and in a cultured environment. At the age of 16, as he desired to become a surgeon, he was apprenticed to Mr. Edward Nourse, a surgeon at Saint Bartholomews Hospital, who had a private school in which he taught anatomy and surgery. During his apprenticeship he devoted his time to anatomical dissection and to the technique of operative surgery on the cadaver. He later became prosector, read and studied the best books of the time and of his predecessors, made hospital rounds, and attended operations with his preceptor. Finally with this preparation he applied before the Court of Examiners successfully, and was granted the diploma for the practice of surgery. In 1745 after an internship at Saint Bartholomews Hospital, he was appointed assistant surgeon, and four years later full surgeon, succeeding the famous William Cheselden, an outstanding surgeon and lithotomist.

Pott, who was small of stature, was endowed with a kind and charitable disposition, was a good conversationalist and fond of society, was always well dressed, clean shaven, and wore a wig.

As a teacher he stressed the fundamental importance of a thorough knowledge of anatomy—in his own case achieved by keen observation through dissection. He advised his students to read old authors, and to offer criticism thus, in the light of their enhanced anatomical knowledge. Foreign students from the Continent and America were attracted to old Saint Bartholomews to attend his impressive lectures, and to observe the surgical operations performed by this eminent master.

As a surgeon he excelled. He made many original contributions to the surgery of his time; these became the masterpieces of his day. Pott introduced numerous important innovations and procedures in clinical surgery, besides abolishing the extensive use of escharotics and the actual cautery which were customary during the period. He also simplified and evolved better instruments and surgical dressings. The great John Hunter was one of his pupils.

In making reports of his extensive surgical experiences and keen observations resulting from his superior knowledge of anatomy, he discovered in himself a real ability and pleasure in writing in his chosen field. Recovering from an accidental fall from a horse, in which he sustained a compound fracture of the fibula, he published a thorough account of this fracture which to this day is known as Pott's fracture. Following this he began to produce in rapid succession such masterpieces as his "Treatise on Hernia," 1756; "Head Injuries," 1762; "Hydrocele," 1762; "Fistula," 1765; "Fractures and Dislocations," 1768; "The Account of Chimneysweeps Cancer," 1775; and the epoch-making article on "Palsy" from spinal deformity caries, Pott's disease, 1779. In 1783 he completed and revised in three volumes

his Chirurgical Works, which contained all his writings. Four years later he resigned as surgeon to Saint Bartholomews Hospital after a monumental service of 42 years.

He was awarded the first honorary diploma ever granted from the University of Edinburgh, and was honored by the College of Surgeons of Ireland. He also was granted the distinguished award of Fellowship in the Royal Society, the highest honor granted to great men of science.

After his retirement he practiced for a brief period of three months and was then stricken with a fatal pneumonia, and at the age of 75, on December 22, 1788 was laid to rest at Aldermary Church in Bow Lane.

The day before he died he uttered: "My lamp is almost extinguished. I hope it has burned for the benefit of others."

Cancer of the Scrotum

The Chapter on Chimney Sweeps' Cancer by Percival Pott

RAMAZZINI has written a book de morbis artificum; the Colic of Poitou is a well-known distemper; and everybody is acquainted with the disorders to which painters, plumbers, glaziers, and the workers in white lead, are liable; but there is a disease as peculiar to a certain set of people, which has not, at least to my knowledge, been publicly noticed; I mean the chimney-sweepers' cancer.

"It is a disease which always makes its first attack on, and its first appearance in, the inferior part of the scrotum; there it produces a superficial, painful, ragged, ill-looking sore, with hard and rising edges; the trade call it the soot-wart. I never saw it under the age of puberty, which is, I suppose, one reason why it is generally taken, both by patient and surgeon, for venereal, and being treated with mercurials, is thereby soon and much exasperated: in no great length of time, it pervades the skin, dartos, and membranes of the scrotum, and seizes the testicle, which it enlarges, hardens, and renders truly and thoroughly distempered; from whence it makes its way up the spermatic process into the abdomen, most frequently indurating and spoiling the inguinal glands: when arrived within the abdomen, it affects some of viscera, and then very soon becomes painfully destructive.

"The fate of these people seems singularly hard: in their early infancy they are most frequently treated with great brutality, and almost starved with cold and hunger; they are thrust up narrow, and sometimes hot chimneys, where they are bruised, burned, and almost suffocated; and when they get to puberty, become peculiarly liable to a most noisome, painful and fatal disease.

"Of this last circumstance there is not the least doubt, though perhaps it may not have been sufficiently attended to, to make it generally known. Other people have cancers of the same parts; and so have others, beside lead-workers, the Poitou colic, and the consequent paralysis; but it is nevertheless a disease to which they are peculiarly liable; and so are chimney-sweepers to the cancer of the scrotum and testicles.

"If there be any chance of putting a stop to, or preventing this mischief, it must be by the immediate removal of the part affected; I mean that part of the scrotum where the sore is; for if it be suffered to remain until the virus has seized the testicle, it is generally too late even for castration. I have many times made the experiment; but though the sores, after such operation, have, in some instances, healed kindly, and the patients have gone from the hospital seemingly well, yet, in the space of a few months, it has generally happened, that they have returned either with the same disease in the other testicle, or in the glands of the groin, or with such wan complexions, such pale, leaden countenances, such a total loss of strength, and such frequent and acute internal pains, as have sufficiently proved a diseased state of some of the viscera, and which have soon been followed by a painful death.

"If extirpation ever bids fair for the cure of a cancer, it seems to be in this case; but then the operation should be immediate, and before habit is tainted.

"The disease, in these people, seems to derive its origin from a lodgment of soot in the rugae of the scrotum, and at first not to be a disease of the habit. In other cases of a cancerous nature, in which the habit is too frequently concerned, we have not often so fair a prospect of success by the removal of the distempered part; and are obliged to be content with means, which I wish I could say were truly palliative: but here the subjects are young, in general in good health, at least at first; the disease brought on them by their occupation and in all probability local; which last circumstance may, I think, be fairly presumed from its always seizing the same part: all this makes it (at first) a very different case from a cancer which appears in an elderly man, whose fluids are become acrimonious from time, as well as other causes; or from the same kind of complaint in women who have ceased to menstruate. But be all this as it may, the scrotum is no vital organ, nor can the loss of a part of it ever be attended with any, the smallest degree of inconvenience; and if a life can be preserved by the removal of all that portion that is distempered, it will be a very good and easy composition; for when the disease has got head, it is rapid in its progress, painful in all its attacks, and most certainly destructive in its event."

Go South, Old Man

SOME scientific wag has stated that the treatment of the elderly becomes the yardstick of a civilization. The colder the climate, the more haughty an attitude develops. The warmer the climate, the kindliness towards the aged kindles.

From "Geriatrics and the Aging Personality," by C. HOWARD ROSS, M.D., in *The Journal of the Michigan State Medical Society*, 54:5 (May), 1955.

Letters

Absenteeism

TO THE EDITOR: The editorial "Laudable Absenteeism" (August, 1955) is excellent. I, too, was proud of a record of decreasing absenteeism among employees, until I asked for the number of men who lost no time from work during a certain year. On medical examination of these men, I found quite a number who were working with disabilities which should have been corrected. Also the wonder grew why these individuals kept on working with their hernias, hypertensions and varicosities, even extensive varicose ulcers. It would be so much better could a report be made of the potential illnesses discovered and correction urged, e.g., early carcinoma, diabetes, coronary occlusion, than that the absentee rate had been reduced by a certain percentage. There is room for controlled absenteeism, but the preventive side of industrial medicine holds the future interest.

—R. B. ROBSON, M.D., Medical Director,
General Motors of Canada,
Walkerville, Ontario.

Cutting Fluids

TO THE EDITOR: The paper entitled "The Carcinogenic Properties of Cutting Oils," by William B. Taylor, M.D., and Richard E. Dickes, M.D., in the current issue of *Industrial Medicine and Surgery* (24:7, 309 (July) 1955) is of interest to many of us in the petroleum industry. The distribution and the histology of the lesions, plus a long history of dermatitis associated with inadequate removal of cutting fluids from the skin of the affected areas, suggests strongly that these oils were of importance in the production of the lesions. It is noteworthy that the exposure extends back some 35 to 37 years in these two cases. This is in keeping with the results of the experimental work cited, namely that tumor production is uncertain and not easily reproducible even with prolonged exposure. If cutting fluids are a common contributory cause of skin malignancies, it is indeed surprising that this has not been recognized at an earlier date.

The referral to high boiling catalytically cracked fractions is unfortunate since cutting fluids are in no wise related to such fractions. Referral to British studies is confusing since many of the commonly used materials are not comparable chemically to those used in American industry. For example, shale oils have been used extensively by the British for the production of lubricants in contrast with American industry which has relied almost entirely upon crude petroleum sources. The cutting fluid "problem" is complex since trauma (metal fragments), chemical additives and bacterial contamination complicate the evaluation of the role played by any petroleum constituents in the production of dermatitis.

Exception is taken to the statements...."So far, few cases of skin cancer have developed in humans but increased incidence can be expected as the length of the exposures increases," and "....there are reported a number of cases of skin cancer occurring in the petroleum industry...." While the source of these opinions is not stated, we can report that careful tabulation of each and every skin cancer among employees in a large oil company during the past five years gives no credence to the innuendo that petroleum is a common cause for such lesions. Skin cancers among these employees vary with exposure to sunshine and have no predilection for the hands and arms but tend to occur predominantly about the face. The cell types vary according to expected relative frequencies. There is no reason for assuming that any and all of these lesions would not have occurred had the individuals never worked in the petroleum industry.

Finally, the report fails to emphasize the very fundamental fact that simple personal hygiene is adequate protection for workers wherever the use of cutting fluids is thought to be associated with a health problem. Dermatitis and its complications are not necessary occupational hazards in the metal cutting industry.

—LEO WADE, M.D., Medical Director,
Esso Standard Oil Company.

Anniversary Meeting

TO THE EDITOR: The Association of Industrial Medical Officers (London, England) will have been in existence for 20 years in September, 1956. We are celebrating this event by holding a special Anniversary Meeting in London from September 24 through September 28, 1956. The Committee which is making the arrangements for the Meeting have asked me to write to you to give you this information in good time, and to tell you that you and any of your colleagues in industrial medicine will be very welcome at this Meeting.

—DR. P. A. B. RAFFLE, Secretary,
Anniversary Meeting Committee,
Griffith House, 280 Marylebone Road,
London, N.W. 1, England.

Books

Railroad Tracking

THE RAILROAD POLICE: H. S. DEWHURST. Charles C. Thomas, Springfield, Illinois, 1955, 224 pp., $5.50.

With propriety, this book might be reviewed with its emphasis on the contribution of the railroad police to railroad accident prevention. With equal justification, the emphasis might be directed to the railroad police as an ally of the railroad surgeons at the time of accident injuries. None of that would provide the engaging flavor of this book which is to be found in endless stories revealing the range of railroad police activities. One such story exemplifies many:

"A woman traveler with a couple of hours to spare between trains decides to check her baggage in a locker. She has a coat over her arm, a large size pocketbook, and another small grip she wants to keep with her. She's having difficulty in handling all these items and getting the heavy suitcase into the locker. She doesn't think to call over a station porter. And just as she is in the middle of this confusion, a suave, smiling, confident man suddenly appears before her and offers his assistance. Before she has had an opportunity to say yes or no he's got the suitcase inside the locker and she is being handed the key. At least 'a' key . . . for this is the old 'switcheroo' gag, and the key that she now has fits some other and empty locker, quite likely even in another station. But she thanks him and goes about her business, unaware that very shortly after she is out of sight that 'kind gentleman' will return to the locker with the key which fits, extract her suitcase and be on his way—on his way, that is, if he has been able to get by the watchful eyes of the railroad police officer or terminal policeman who has a sixth

sense about these things which is amazingly accurate."

However, this book is no mere collection of unique stories. In earnest fashion it traces the background and development of the railroad police force, its organization and duties, the enormity of difficulties encountered in trespassing, and the attractive perils that all railroading holds for juveniles. And it ends with a well-developed section on railroad public relations as served by the railroad police.

Whatever the approach may be to the reading of this book, which has no precedent, both intriguing narrative and downright values abound.

Over-fatigue

LEISTUNGSSTEIGERUNG: Leistung, Übermüdung, Gesunderhaltung: HOCHREIN, M., and SCHLEICHER, I. Georg Thieme Verlag, Stuttgart, Germany. Third Edition, 1953, pp 283, approximately $6.50.

The title of this volume might be translated "Increase in Performance: Performance, Over-fatigue, and Maintenance of Health." The authors have embarked on an ambitious course of interpreting disease states as manifestations of inefficient performance with over-fatigue. The work patterns of man are carefully examined with regard to drives, endurance, and capabilities. It is a delight to find that an endogenous or inborn urge to work has been delineated by the authors as a factor present in all human beings. The manifestations of over-fatigue are then described in considerable detail. Over-fatigue is proposed as a critical factor in the genesis of many well-known clinical syndromes such as coronary artery disease, gastritis, and bronchial asthma. Remedial factors that may be effective in combating or preventing over-fatigue are then considered. A discussion of drugs and stimulants of value in this area is presented. The therapeutic factor greatly stressed by the authors is physical conditioning. By this means, work capacity is increased and over-fatigue eliminated. This small volume is of interest in that it presents an unusual approach to the causes of illness and incapacitation. The sections dealing with the physiologic reactions of man to physical effort and the changes observed during over-fatigue are highly recommended. The extension of these observations into the broader fields of internal medicine is considered, by this reviewer, as a less fruitful effort. —MALCOLM C. MCCORD, M.D.

"Gentlemen, The Queen!"

THE DOCTOR WRITES: S. O. WAIFE. Grune & Stratton, Inc., New York, 1954, pp. 175, $3.75.

Since doctors have mighty little time to loll in hammocks, the label of "Hammockia" attached to this book only would serve as a repellent to reading. Besides, its category is at a higher level. Disturbingly it provides the temptation to urge a year's moratorium on exclusive scientific reading by physicians. All along physicians know far more medicine than they get around to applying. That Sabbatical year would not be lost to science since most physicians substituting readings like the contents of this book might be stirred to better scientific attainments. The plaint is that rarely do scientific articles have any whit of literary value. Still to the well-knowing, a physicist's elaborate equation is a musical score and a well-made roentgen film is a sonnet. The possibilities are not labored, but physicians and other doctors do make literary contributions. And so this book.

This compiler found, over a period, 17 publications that defied cataloging and filing away into oblivion. That was proper, since nothing that pulses should be interred. One deals with Dr. Joseph Bell, the teacher of Conan Doyle, and thus the grandfather of Sherlock Holmes. Holmes was the extender of Bell just as Klauder, the immediate writer, is the extender of Holmes into emphasized dermatology in Sherlockiana. Conan Doyle was no mean dermatologist. Properly the article lauds the acumen of old-time physicians in seeing the signs of diseases and occupational stigmata. Not at all is it damnable that a later article in the book makes a myth of this traditional astuteness of old physicians. Both are right.

One contribution by Otto Glasser (not Otto Glaser, the zoologist), "The Human Side of Science," centers about the low controversies that sprang up around Roentgen after his discovery of the x-ray. A major disaffection was that Roentgen, not a Jew, was too friendly with Jews. Many another distinguished scientist has provided a place in history for sorry characters solely because they stupidly attacked the great. So it was as to George Baker of Devonshire Colic fame.

A few decades ago the most notorious of quacks was Albert Abrams. Now along comes Nathan Flaxman who is no apologist for Abrams but finds in Abrams' early writings a quality of genius, a genius that possibly passed over into insanity. That author does not lean heavily upon any possible insanity as the crutch of plausibility for Abrams' evil doings.

And so the flow goes into "Showmanship in Medical Teaching," "Medicine in the Bible," "Creativeness in Medicine," and on. The one most removed from medicine and the one hardest to anticipate as to contents from the title alone and yet possibly the finest in the lot is "Gentlemen, The Queen." Guess all you please as to what it is about. And then, the revealment—the rise in power of the queen in the game of chess. Balderdash? Then read the article.

This Journal, long dedicated to better reading by physicians, salutes an ally—the compiler.

Emphasis on Treatment

THE DISEASES OF OCCUPATIONS: DONALD HUNTER (London, England). Little Brown & Company, Boston, 1955, pp. 1072, price $20.00.

It was high time that a new book on occupational diseases should have directed some emphasis to treatment and management of the patient. Occupational health, with justification, has made such a fetish over prevention that many substantial books have become all prevention and diagnosis and detection of the causative agents. Naturally such writings would characterize books by the non-medical industrial hygienist. This present book makes up for many past deficiencies.

It may be doubted that this book could have been written in the United States. Most books on occupational health originated and published in the United States bear too many signs of compression, of the weeding out processes, and the reduction to the state of over-tabulation. Europeans, and notably within the British Isles, display a flair for engaging asides along with technicalities. Making improper use of the English language, this book may be described as "leisurely." There is nothing hurried about it, no indications of tearing down to small size. It provides endless history, backgrounds, brief biographies of some workers in the field, accompanied by their photographs. This has not been accomplished at the expense of scientific

presentation of the current status of occupational diseases.

Many of the illustrations appear to be, and in fact are, old. This may be condoned on the grounds of the statement earlier made that this work partly is a volume of history. Those old illustrations themselves are a part of history. By standards of the United States, many of the illustrations purporting to be current are little so.

This volume admirably lends itself to text use for students. The even balance between history, biography and the clinical is just what the instructor would impart to students. More than any other known book, this present one meets just that requirement. By no means is that its only virtue. This book meets a sore need for the clinician in occupational diseases.

Expensive, But Worth It

ABDOMINAL OPERATIONS (Third Edition): RODNEY MAINGOT, F.R.C.S. (England). Appleton-Century-Crofts, Inc., New York City, 1955, pp. 1568, $24.50.

This third edition of Maingot's deservedly popular text is the most up-to-date and comprehensive textbook on this subject in the opinion of the reviewer. In its 1568 pages are discussions of every conceivable abdominal disease. Several chapters have been written by American authors. With each subject there is a discussion of etiology, symptomatology, and diagnosis. The author gives a review of different types of operations for various lesions and indicates his preference, with clearly stated reasons. The 450 pages devoted to surgery of the stomach and duodenum are exceptionally well done. There are chapters on types of abdominal incisions and many references to pre- and post-operative care. The references are well selected and the index is excellent. The volume is beautifully illustrated. The internist and diagnostician will find much of value in this book. It should be in the library of everyone interested in the field of abdominal surgery. —CHESTER C. GUY, M.D.

Yet Another Duty

SCIENCE AND MAN'S BEHAVIOR, THE CONTRIBUTION OF PHYLOBIOLOGY: TRIGANT BURROW, M.D., Ph.D. Philosophical Library, Inc., New York, N.Y., 1953, pp. 564, $6.00.

This book is going to prove to be mighty important to an esoteric few who are able to move with freedom among these ex-cathedra pronouncements of the late Dr. Trigant Burrow, who in his writings seldom removed himself from an ultra-scientific throne. In the midst of much talk a few years ago about "one world," Anton Carlson brightly made the observation that there could be no one world in the absence of "one human species." By and large that became the framework of this book as reflected in this quotation:

"It was man's preoccupation with the known, the traditional and habitual in the field of behavior that commanded the interest of my associates and myself, and prompted our efforts of research. Man is 'right.' He wants to be 'right.' He will fight; if necessary he will die in defense of his rightness. John Huss, Joan of Arc, Hitler and Cotton Mather are only a few of the many historic examples of this 'rightness' though they have no feature in common save a passionately held conviction of the truth of a private preconception. But how correct, how sound biologically is this 'rightness' with which man—every man—is now filled to the point of obsession? Our group researches disclosed that for each man the rightness of himself—the rightness of his views, his aspirations, his convictions, his interest and pleasure—is dynamically the strongest urge, the most powerful incitement within his emotional life; that this universal incitement dominates all the other behavior drives within the human breast. We sought to analyze, we sought, wherever possible, to run to cover this popular prepossession that is the fiercest claim, the readiest assertion within civilized man. We found that the 'right' which you and I demand and exercise at all times and under all circumstances rests upon an emotional complex that is utterly without warrant. This complex is the basis of the greatest distortion in human life, namely, the domination of the mind of man by emotional preconceptions. Phylobiology, then, challenges everything in this behavioral field of the cherished 'known.' It challenges known precepts, known habituations that have been our all in all, because our group investigations disclosed that the behavior we call right and good is not biologically sound and healthy."

The meanings of this book—monumental as they may be—are walled off from the average medical reader by its language. Thus for example:

"The troubled spirit and the inquiring mind—Sociomoral precepts cannot replace phylorganism's homeostasis—Serious impediment to unity of the phylic organism—Segmentation of its various functions—Collapse of social institutions inevitable outcome—"

Standing in awe of this book, enough effrontery remains to contend that the editor, Dr. William E. Galt, has another duty in his admiration and affection for Dr. Burrow—the duty of translating all of this pontification into the language of all those human beings whose misbehavior threatens the existence of the human race.

Silicosis Disability

A PRIMER OF PULMONARY FUNCTION: HAROLD GUYON TRIMBLE, M.D., and JAMES KIERAN, M.D. California Tuberculosis and Health Association, Oakland, California, pp. 22, (apparently free).

X-ray findings suggestive of silicosis alone never warrant a diagnosis of that disease in the absence of a history of substantial exposure. Positive x-ray findings plus history of exposure may justify a diagnosis of silicosis, but seldom may any position be taken as to disability in the absence of indications of infection. While in some jurisdictions a monetary award may be made solely predicated upon the existence of that disease and without regard for the presence or absence of disability. In the majority of jurisdictions, awards are made solely on the grounds of disability. The determination of disability, the outstanding desideratum, overtaxes the facilities available to the usual physician making diagnoses of silicosis. Perhaps in not more than a dozen Medical Centers over the land do working programs exist through the application of which it is possible with a fair degree of certainty to appraise disability.

This pamphlet reviews that situation and provides a series of simple tests, the majority of which with a minimum of equipment may be conducted in routine office or hospital activities. The test, described through design, fails to include some other more elaborate tests that are not encountered except in pulmonary specialty function laboratories. These are not necessary, however useful, in research enterprises. A tremendous gain will be made in the determination of silicosis disability if all physi-

cians responsible for services to compensation bodies will deem their work incomplete unless guided by results from such tests as are described in this booklet.

New View for a Warmed-Over Dish

ACUTE PULMONARY EDEMA: MARK D. ALTSCHULE, M.D., Grune & Stratton, New York, 1954, pp. 68, $3.50.

The precious things in life come in small packages —jewels, babies, and occasionally a small book. Not counting bibliography or index, this author in 60 pages encompasses just about all that is known about acute pulmonary edema. That condition is close to every industrial physician who accepts responsibility for the care of occupational diseases as a generality. Pulmonary edema is the major response to most of the irritant gases and vapors. The author admits that he may be serving a warmed-over dish, but hopes that new points of view alter the flavor. He explores the currently accepted theory of pulmonary edema causation, which theory he states in the following language:

"Physicians who frequently encounter pulmonary edema in practice are often unable to predict accurately either when the syndrome will develop or whether its remission will occur spontaneously or as the result of treatment. These difficulties are common because available information is still incomplete with regard to two basic factors: (1) the physiology of the disorder itself, and (2) the mechanism of action of the therapeutic measures employed. However, these inadequacies are masked by the currently accepted theory of the origin of pulmonary edema. According to this theory, which is superficially reasonable, pulmonary edema is solely the consequence of isolated or disproportionate failure of the left ventricle—the right ventricle presumedly being either normal in function or less weakened than the left."

All in good time he reaches the conclusion that all that happens in pulmonary edema is not well disclosed.

Stimulating Speculations

"THE DYNAMICS OF VIRUS AND RICKETTSIAL INFECTIONS": An International Symposium edited by F. W. HARTMAN, F. L. HORSFALL, JR. and J. G. KIDD. The Blakiston Company, New York and Toronto, 1954, $7.50.

This book presents the papers and discussion from a symposium on recent research and theory in virus and rickettsial diseases which was held at the Henry Ford Hospital in Detroit. The publishers are to be commended for their prompt presentation of this material. The most important feature of this volume is its breadth, which is evident in several respects. The papers included came from a number of the best research laboratories in this country, both university and industrial, and also from institutions in Great Britain, Denmark, Australia and Malaya, and were presented by outstanding scientists.

The symposium was not limited to any one type of infection; human, animal, plant and bacterial were all included. The broad divisions of the book include mechanisms of infection, ecology and pathogenesis, immunity, laboratory diagnosis, and prophylaxis and therapy. Some papers are largely devoted to the presentation of experimental or observational data, while others cover the more general aspects. While one cannot always agree with the generalizations and speculations presented, they are necessary attempts at intelligent integration, and are always stimulating even when they are not completely acceptable.

In addition to being favorably impressed with the general qualities of the book, this reader was particularly interested in the ecological discussions and material of Drs. Shope and Audy. We are reminded here again (and we cannot be reminded too often or too forcefully) that alteration of our environment, particularly in the use of land brings with it a train of other alterations which may sometimes be very dangerous or disturbing. This is true whether the changes be made initially for agricultural, industrial or recreational purposes. It is increasingly apparent that no environmental alterations can be instituted or operated without serious and constant attention to the disturbances which they may or do create in the community or area concerned. —R. J. M. HORTON

The Written Word

GRAPHOLOGY AND THE PHYSIOLOGY OF HANDWRITING (Graphologie et Physiologie de L'Ecriture): H. CALLEWAERT, E. NAUWELAERTS, Louvain, Belgium, 1954, pp. 168, $1.80.

A portion of this study relates to rehabilitation after an injury which hampers handwriting. Using motion picture techniques, the author has analyzed the complex motion and manners involved in this form of rehabilitation and to some extent of handwriting.

In addition, some consideration has been directed to handwriting manners and motion in connection with character and personality type. He observes that the movements of handwriting are not always in keeping with the expressive gestures which accompany language. The conclusion was reached that graphology is of little value in connection with the selection of prospective employees except as good writing is requisite to the duties to be performed.

The results of the investigation, some of which are still unpublished, relate to the performance of teaching handwriting in the schools and less frequently in connection with teaching illiterate adults.

The Fourth Bailliere

BAILLIERE'S HANDBOOK OF FIRST AID AND BANDAGING (Fourth Edition): A. D. BELILIOS, D. K. MULVANY, K. F. ARMSTRONG. The Williams & Wilkins Company, Baltimore, 1955, pp. 463, $2.75.

Previous editions of this British book have saved lives and this new fourth edition will make its own contribution to life saving. Sir Cecil Wakeley, in his foreword, labels this book "the best, the most up to date, and the most practical handbook on first aid and bandaging that has been written." That point is not debated but it is agreed that in this compact volume, more items than usual are introduced and yet the coverage does not extend beyond those acts within the proper functioning of the layman.

More than one place in this text the direct statement or implication is that a great deal of newness has found its way into the first aid measures, calling for some discarding of the old. Apart from the innovation of the Holger-Neilsen method of artificial respiration, it is not agreed that so much new has appeared that an individual skilled in the measures of five years ago is not qualified to serve ably at the present time.

This book will find its greatest demand in the British Isles and in other portions of the British Commonwealth and Empire.

INDUSTRIAL MEDICINE AND SURGERY

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Volume 24 — SEPTEMBER, 1955 — *Number 9*

Thirteenth International Congress on Industrial Medicine

THE 12TH International Congress on Industrial Medicine happily is scheduled to be staged in 1957 in Helsinki. Logically, the 13th International Congress should come to the United States. That is the desire of the American delegation and unfailingly an invitation will be extended at the time of the Helsinki assembly. Despite the acceptability of every facility, it may be doubted that any favorable response will follow this invitation. The first deterrent resides in the manifestly unfavorable exchange rates for money. While some few of the 40 nations that participate in the International Congress would be unaffected by money situations, the greater number of representatives of European countries, apart from governmentally sponsored representatives, would be kept away. However, that is not the major handicap. The vaunted freedom, liberty and democracy of the United States chiefly are something reserved for its own nationals. Scientific visitors from other countries encounter, on many occasions, enormous difficulties in entering this country even for short visits. That story is well told in an editorial in the *Saturday Review* (June 4, 1955) entitled "How to Keep the Scientist Out," a portion of which is here introduced:

"International scientific meetings are essential to scientific progress for the reason that no one nation has a monopoly of either ideas or brains. Science has always been international in scope, so much so that one would be hard put to name any scientific or technological development which did not depend for its success upon discoveries which had been made previously by scientists from a number of nations. Yet it is noteworthy that not all scientists in the world are eligible to attend international scientific conferences. The Governments of both the Soviet Union and the United States have particularly strong convictions in this respect, with the result that few international meetings of any consequence are held these days in either the USSR or in the USA.

"It is important that we realize that it is next to impossible for a major international meeting of scientists to be held in the United States for as long a time as we maintain our existing regulations about who may enter the United States and who may not. I know of no scientist in our country who would be so foolhardy as to spearhead the organization of a major international scientific meeting in the United States, particularly in the light of the substantial number of embarrassing situations which have emerged during past attempts. In this connection I remember vividly an international conference on nuclear physics which was held a few years ago at the University of Chicago. The director of the Institute for Nuclear Studies almost lost his mind in the process of organizing the meeting. He first had to make guesses as to which foreign scientists might be given or refused visas. He next had to guess which of the scientists who might receive visas might be detained by authorities upon arrival in this country. Of course, it turned out that with the exception of known Communists these matters are completely unpredictable.

"For the purpose of avoiding embarrassment an attempt was made to submit a list of proposed invitees to the State Department with the request that it make the necessary inquiries and indicate which of the scientists might, and which ones

might not, be admitted. In this way it was hoped to formulate a guest list which would contain primarily the names of the individuals who might have had a reasonable chance of receiving visas and of being admitted to this country. Needless to relate, however, this was not the way in which the State Department functioned. We were told that we must first send out the invitations, then the individuals must apply for visas, then each case would be decided on the basis of its individual merits.

"As the day for the opening of the conference approached there was great confusion, still greater embarrassment, and not until the day the meeting opened did the organizers have any real idea as to who the foreign participants might be. The director swore that he would never again attempt to organize an international conference of scientists to be held in the United States."

Occupational Health in India

YEARLY this Journal awaits the arrival of the refreshing annual report of the Department of Industrial Health, Tata Industries Limited, of India. The Tata Industries and its Industrial Medical Department are far from typical of the industries of that land. Yet in this annual report, an attitude is reflected that would be good for all of India's industries.

As an antidote to any smugness among industrial physicians of the United States that the best in thinking and planning for occupational health is confined to this country, let the concepts of India here appear. This item represents a portion of the introduction to an extensive technical report revealing the medical activities and achievements for the year 1954.

" 'The ordinary man—if he's healthy—wants to work.' This law of health and work is the *raison d'etre* of industrial medicine. But man is a social animal, besides an individual in his own rights. His work has to be made socially satisfying if his production and productivity as an individual are to reach and maintain a high level. Further, 'Man is more than a social animal, he is also a culture-bearing creature . . . Although free-born, he is culture bound.' Indian labour is made up of people with different cultures. A further complication is informal groups of workers emerging voluntarily on the factory floor, and demanding recognition. Each such group is bound by its own pattern of norms and rules which it translates into its own ideas, attitudes and actions. To give his best the industrial worker needs the help of the modern concept of integrated medicine to develop as an indivisible entity of individual, social and cultural aspects. This concept, which includes within its sphere engineering and social sciences besides typically medical disciplines, is the guiding principle of the Industrial Health Department.

"The basic framework of modern industry is technology, but its sustaining lifeblood is human relations. Modern business is a complicated structure of several aspects like technology, finance, administration, sales, purchases, public relations, and so on. In the ultimate analysis, however, good business is good industrial relations; and 'no more intimate aspect of good human relations exists in business today than its industrial health and safety programs.'

"This opinion of an industrial physician is backed by an eminent industrialist and economist who has said, 'Every great step in technological advance has brought with it new human problems of adjustment and reconciliation; and the key to their understanding lies in the social sciences.' And the preventive and constructive side of industrial medicine is more a social science than biologic, since its intention is to deal with groups of well people in order to preserve and improve their well-being, since its emphasis is on life, its growth, and its fulfilment rather than on death, disease and cure."

Need to Know the Law

THERE is a tremendous need in our country for a better knowledge of existing social legislation, since every man, woman, and child is in some way affected by social security laws, labor laws, compensation laws, and so on. Doctors, particularly, need to know what the law is, since the lives and health of their patients are so profoundly influenced by economic status. Industrial physicians not only should, but also are obliged to know operating laws, not alone of compensation but likewise laws relating to non-occupational sickness and injury, old age and social security, as well as other welfare laws. This, then, is one phase of industrial practice that differs from private practice and may be considered possibly a difference in emphasis. The industrial physician, however, is also more obligated in the recording, reporting, and appraisal of illnesses and injuries, even those which seem to be non-occupational in origin. It is well-known that a headache or backache can occur while off duty and be unrelated to work on the job; but too many times the symptoms are saved up to occur conveniently when the employee gets back to work and are presented to the plant doctor as an industrial disability.

—From "The Industrial Physician and Workmen's Compensation," by EMMA DOWLING KYROS, M.D., in *J. Am. Med. Women's Assoc.*, 10.8, 271 (August) 1955.

APPLICATION FOR SPACE IN THE SCIENTIFIC EXHIBITS
1956 INDUSTRIAL HEALTH CONFERENCE
Convention Hall, Philadelphia, Pa., April 21-27, 1956

Application is hereby made to the Committee on Scientific Exhibits for space at the coming joint meeting of the Industrial Medical Association, the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, the American Association of Industrial Nurses and the American Association of Industrial Dentists.

1. State exact title of exhibit suitable for the program and announcements:

_____

2. Description of exhibit. (A description adequate for the information of the Committee is necessary. From this, printed abstract for the program is prepared).

3. Exhibit will consist of the following (Check which):

Charts & posters	( )	Photographs	( )	Photomicrographs	( )
Roentgenograms	( )	Specimens	( )	Drawings	( )
Moulages	( )	Other material	_____		

4. The following equipment will be used (Check which):

Cabinets ( ) Viewing Boxes ( ) Microscopes ( )

Other equipment _____

5. Booth requirements. Please give space requirements so due consideration may be given your application by the Committee:

Length of back wall desired—Maximum: _____ Minimum: _____

Depth of Booth—Maximum: _____ Minimum: _____

Back and side walls for the booths and the maximum of two electrical outlets together with a table and two chairs will be provided by the Committee. Draperies, lighting equipment and additional furniture must be provided by the exhibitor.

Date _____, 19____

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(FULL ADDRESS) (INSTITUTION OR COMPANY)

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might not, be admitted. In this way it was hoped to formulate a guest list which would contain primarily the names of the individuals who might have had a reasonable chance of receiving visas and of being admitted to this country. Needless to relate, however, this was not the way in which the State Department functioned. We were told that we must first send out the invitations, then the individuals must apply for visas, then each case would be decided on the basis of its individual merits.

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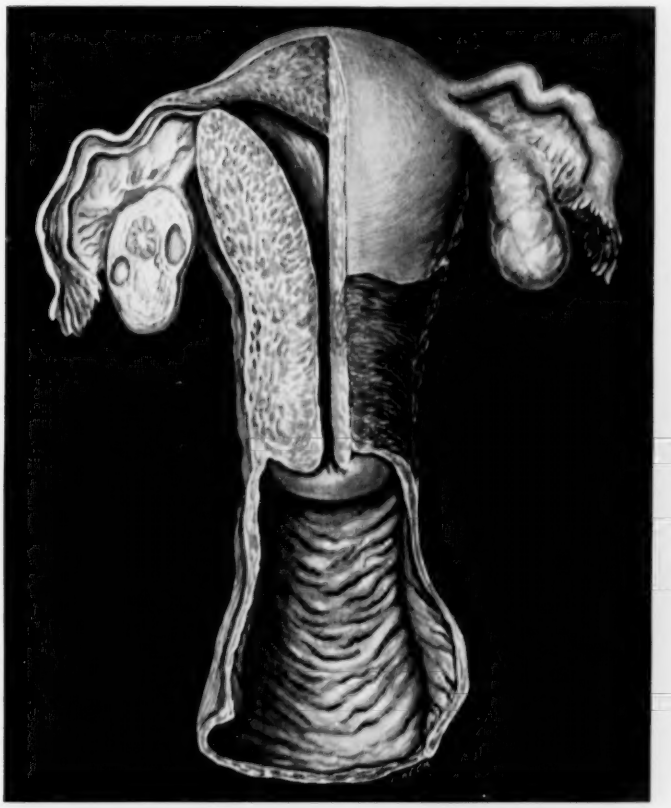

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*Sturnick, M. I., and Gargill, S. L.: New England J. Med. 247:829 (Nov. 27) 1952.

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News, Comment, Opinion

QUESTION: Do any employers agree with the argument that the unions put up in favor of a union shop? ANSWER: Yes, a number do. One employer put it this way: "Everyone who works for us must be vaccinated as part of the company health program. If a Christian Scientist should come along and say he could not accept vaccination, we would reply that we were sorry but there were no economic opportunities for him in our plant. The same holds true for union membership. We would tell the man who does not want to belong to a union that there were no economic opportunities for him in our plant."

—*Chicago Daily News*, June 22, 1955.

"M.D." on the Order

WHEN a housekeeper wants a new can of floor wax she ordinarily doesn't go to a doctor for a prescription. Yet one of Connecticut's busiest housekeepers does just that. The housekeeper is the maintenance superintendent at Pratt and Whitney's aircraft plant in East Hartford. When he wants floor wax, he asks the Purchasing Department to get it for him. The Purchasing Agent then shops for the best buy. When he selects the brand he wants, he can't just order a couple of tons. He has to have a signature on the order first, and the signature has to have an "M.D." after it. This rule is part of the health and safety program at P & W. Before new material, whether it's fuel, floor wax, cutting oil or stainless steel, is ordered, the plant's physicians test it . . . . The health and safety staff includes 15 full-time and four part-time doctors, a dentist, and 55 registered nurses. The dentist, one of the busiest men on the staff, spends most of his time taking x-rays, which are sent to the worker's own dentists. He's also a good man to know should one need an emergency appointment with one's own dentist.

—*Hartford, Connecticut, Times*, June 20, 1955.

Not Excludable

RECENT decision by the Internal Revenue Service deals with a wage earner absent from work because he is under quarantine resulting from illness of a member of the family. During his absence he receives sick leave payments under company health plan. The question was, are these

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Medical Director: (b) Board internist; well qual cardiology; able organize, direct any size med care program; 6 yrs, plant phy and currently ass't med dir, impor Co; late 30's.

Assistant Medical Director: (c) Outstanding yng man inter'd, indus med as career; finishing wk lead'g to Doctorate, Indus Medicine; past yr. indus res one of finest indus medical programs in America; early 30's, recommended as exceptional man with great potentiality.

Industrial Physician: (d) Exceptionally well qual as ass't for lge multiple plant operation; M.D., Cincinnati; trn'd internal med; sev yrs surgical exper; 3 yrs, successful priv pract; 4 yrs plant phy & medical dir medium size plant; now earning $14,000; prefers Mich, Ohio, Ind; well qual EKG; middle 30's.

Staff: (e) 5 yrs res, internal med, univ hosp; 2 yrs, med office; ammunition depot; inter'd indus hygiene; cat IV; late 20's; serious ygn doctor, immediately available.

Staff: (f) Indus phy, sev years, one of finest med facilities of lead'g Co; Medical degree, Harvard; pref N.Y., N.J. Penna; age 30.

Staff: (g) Board elig Internist; Class "A" school; sev yrs successful priv gen pract; inter'd indus med as career; age 30.

Staff: (h) 3 yrs exper as indus phy; sev yrs res, gen'l & orthopedic surg; prefers Pacific Coast; early 30's.

Staff: (i) 6 yrs, successful priv gen'l & surgical pract; prefers indus med with regular hours; early 30's; Cat IV; Class "A" grad.

SITUATIONS OPEN

Medical Director: (g) One of leading companies; vicinity Los Angeles; req's man with exper; inter'd in indus med as career.

Medical Director: (i) Preferably with exper in medicine; lge plant, division of major company; Gulf Coast area.

Medical Director: (i) One of finest indus programs; dept well staffed & equipped; excel policies; 2000 empl; warm year-round climate; smaller res town; $12,000; SE.

Medical Director: (j) Ass't; regional plant of company, leader in its field; 12,000 empl; duties, admin program of 4 full time, 10 part time M.D.'s; key post; lge city; E.

Staff: (k) Indus clin major Co; 14,000 empl; $12,000; lge city, univ med center; MW.

Staff: (l) Leading Co in its field; shld be qual in admin; $21,000; city 500,000; West.

Staff: (m) Charge of med activity of 2 research facilities involving 1500 persons, req's one trn'd internal med; $12,000; lge city; univ medical center; MidE.

Staff: (n) Very lge Co; heavy industry; staff of 4 M.D.'s will have staff privileges local hosp. Complete X-Ray & lab facil; own indus hygiene lab; town 60,000 1 hr. to Chgo.

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sums excludable from the worker's gross income? They are not, according to the ruling by Internal Revenue Service.

—*Ohio State Med. J.*, July, 1955.

No Medical Department

FIFTY persons were overcome by poison gas fumes at the Advance Relay Company plant in Burbank, California on August 4. The victims were taken to St. Joseph's Hospital, where several were reported in serious condition. Thirty, including several women, were reported in a coma after treatment. Some were said to have become partly paralyzed. Doctors said the fumes inhaled by the victims were so poisonous their cases might be considered "critical" for four or five days. Lt. Oscar Ostroff, of the Burbank police department, said the workers were overcome by a new chemical, to which acetate had been added, when it leaked while being poured into containers. Twelve men in the area dropped to the floor unconscious. Soon, other workers in the department also collapsed. Police and fire departments were called as well as physicians. The oxygen supply at the plant, recently acquired by the Elgin Watch Company, became exhausted during the first aid maneuvers and ambulances sped the victims to the hospital in relays. Top secret electronics devices are manufactured at the plant.

—*Chicago Herald-American*, August 6, 1955.

Mind or Muscle?

TESTS to show which persons should use their brains and not their backs in making a living are advised by DRS. REX L. DIVELEY and RIAL R. OGLEVIE, of Kansas City, Missouri. The tests consist of careful examination of the back, including x-ray pictures. The Kansas City doctors advise them even for teen-agers, so that youngsters can be advised early to go into suitable occupations where they will not be putting too much strain on backs that cannot take it. Of more than 6,000 persons given pre-employment examinations, only 39.9% had what could be called normal backs, the doctors reported at the meeting of the AMA in Atlantic City. The rest had congenital abnormalities, spinal arthritis, postural defects and other adverse spinal conditions that made them susceptible to low back injury or disability. As a result of such examinations, the doctors said, industries can be saved compensation claims and workers can be saved time lost, not to mention the aching backs.

—*Science News Letter*, June 25, 1955.

No Cancer

A SERIES of tests in Britain have produced no link between cigarette smoke and lung cancer, the British Empire Cancer society reported today at its annual meeting. Five strains of mice were treated for 18 months with two preparations from cigarette smoke tar. Large groups of other mice were exposed to cigarette smoke all their lives. Twenty-four hamsters were exposed to cigarette smoke all their lives. Twenty-four hamsters were exposed to the smoke of 50 cigarettes daily in a special cabinet for eight months. Tar from mechanically smoked cigarettes was fed and injected into the lungs of mice. Extracts from cigarette papers

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- Contact Dermatitis IS THE MOST FREQUENTLY ENCOUNTERED OF ALL DERMATOLOGICAL DISORDERS.
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and filters also were tested. The tests were conducted in London, Glasgow and Birmingham. All were negative, but in view of their importance the tests are being expanded and continued.

—*Chicago Tribune*, July 13, 1955.

Can Work

MOST industrial workers with heart disease can work without risk, according to a three-year study of 350 workers (67% referred by local industry) by Cardiac Work Classification Unit, Heart Association of Southeastern Pennsylvania. Results indicate impressive majority (92%) able to work, without risk to themselves or others. Follow-up of 160 employable persons showed 78% engaged in work. Of these only small percentage (9.5%) showed progression of cardiac disability; 26.0% showed improvement; 64.5% were unchanged. Total group included all occupational classifications: 7%, professional; 13%, unskilled; 14%, service occupations; 17%, clerical and sales; 22%, skilled; 27%, semi-skilled. Of total, 50% were workers most valued by industry for physical efficiency and learned skills (those between 35 and 54 years of age); 30% were 55 years and over. Time lost from work in one year by those with cardiac condition compared favorably with national average for workers classed as "unimpaired." According to study of this factor by Department of Labor experts, time lost due to illness per 100 scheduled work days breaks down this way: Workers with heart disease: 3.1 days (2.11 due to cardiac illness). "Unimpaired" workers: 3.4 days.

—*Industrial Relations News*, August 6, 1955.

Executive Check-Ups

PERIODIC medical examinations keep top executives in trim, according to a survey by Commerce & Industry Association of 319 New York firms, representing all types of business and industry and employing a total of more than 300,000 employees. Of firms surveyed, 41% had preventive health plans in operation, covering more than 14,956 executives and supervisory personnel. Check-ups are compulsory in 20% of the firms with programs. Average of 80% of eligible executives participates in voluntary plans. All plans cover top policy-making executives. Middle management is included in 86%, first line supervisors in 48%, key non-supervisory men in 38%. Only about 10% have age restrictions—minimums from 30 to 50 years, and approximately same percentage requires salary minimums from $5,000 to $15,000. Total cost of examinations is borne by 94% of employers (anywhere from $4 to $300 each, depending on extent and nature of check-up), but 61% get no medical reports, evidently regarding the private character of examinations to be of considerable importance. Most plans provide for examinations in outside clinics, with company Medical Departments, company-selected doctors and employee-selected doctors following in that order. Scope of examination falls into 46 different patterns, including: routine physical check-up (at top of list), electrocardiogram, chest x-ray, blood count, and chemistry. Only four plans call for psychiatric interviews.

—*Industrial Relations News*, August 13, 1955.

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three dozen needle sutures
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- Five years of research has convinced a team of State University of Iowa scientists that breakfast-skippers rob themselves of potential alertness and efficiency during the late morning hours, and that dieters are wrong if they think missing the morning meal is a practical way to lose weight.

- Fifty subjects ranging from 12 to 83 years in age were involved in the studies which began in 1949 and were completed last year. Results of the entire project have just been compiled and summarized.

- The scientists report that for all age groups, the omission of breakfast placed the subjects at a distinct disadvantage in both physical and mental efficiency in the late morning hours.

- The scientists also recorded weight changes for all subjects involved in the study of various breakfast plans, and found that omission of breakfast had no influence on the weight changes observed.

- Also investigated during the course of the research were conflicting claims of those who contend that breakfast should be built around cereal and milk, and those who say the meal should include milk, bacon and eggs.

Both types of meals were given to subjects in the experiments, with no significant differences being found among the physiologic responses in the late morning hours.

- The scientists also studied effects produced on the blood sugar level by breakfasts which contained 10, 15 and 25 grams of protein. Results of these studies showed that 10 grams of protein was inadequate, that 15 grams was "on the borderline," and that 25 grams—which might be found in a meal containing cereal and milk or eggs and milk—was "entirely sufficient" for maintaining the blood sugar at a normal level during the late morning hours.

- From the physiologic point of view, the scientists believe the research has shown that breakfast is an "economic necessity," and that people should manage their time in such a way that permits inclusion of an adequate morning meal in the eating schedule.

During the past six years twenty scientific papers have been published on the "Iowa Breakfast Studies." From these experiments several practical and sound conclusions were reached that provided a good background for organizing September Better Breakfast Month, now in its fifth year, and sponsored by the Cereal Institute as a public service.

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Each tablet contains:
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Now she can smile and be gay on every day

She can hardly believe that she's the same person who used to be a jumble of conflicting emotions, uncontrolled temper, hypersensitive attitudes, and peevish disposition for many dismal days each month.

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1. Vainder, M.: Indus. Med. & Surg., 22:183, 1953

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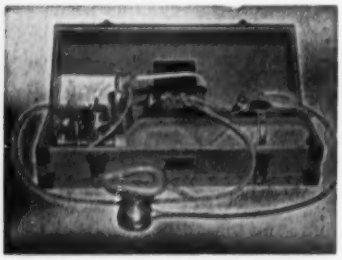

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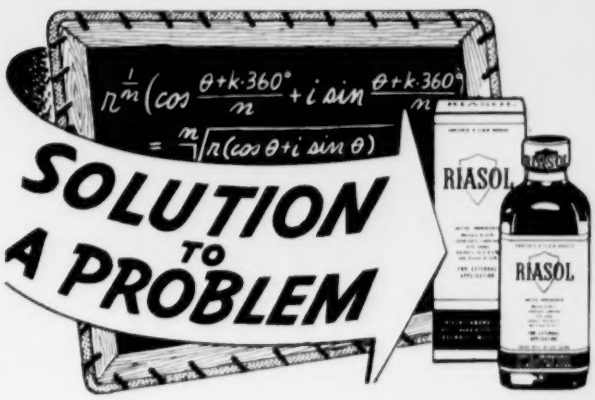

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RIASOL is supplied in 4 and 8 fld. oz. bottles at pharmacies or direct.

1. *M. Rec.* 151:397, 1940.
2. *Arch. Dermat. & Syph.* 35:1051, 1937.

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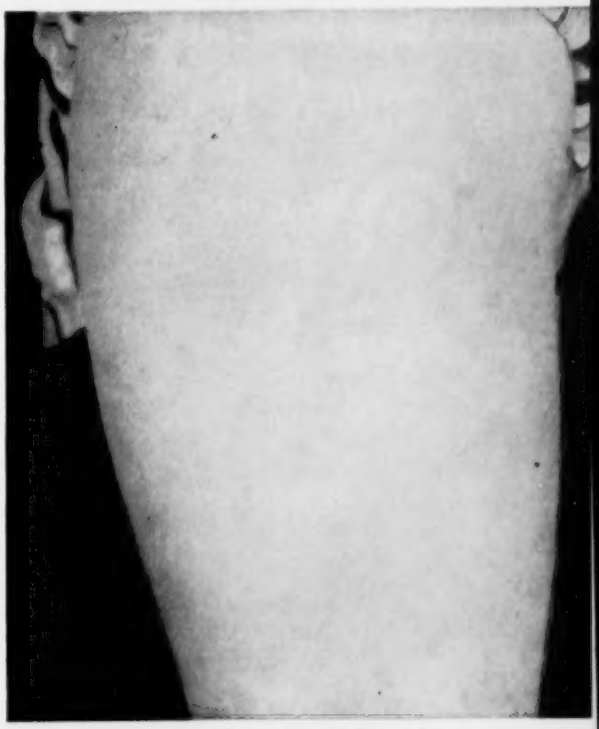

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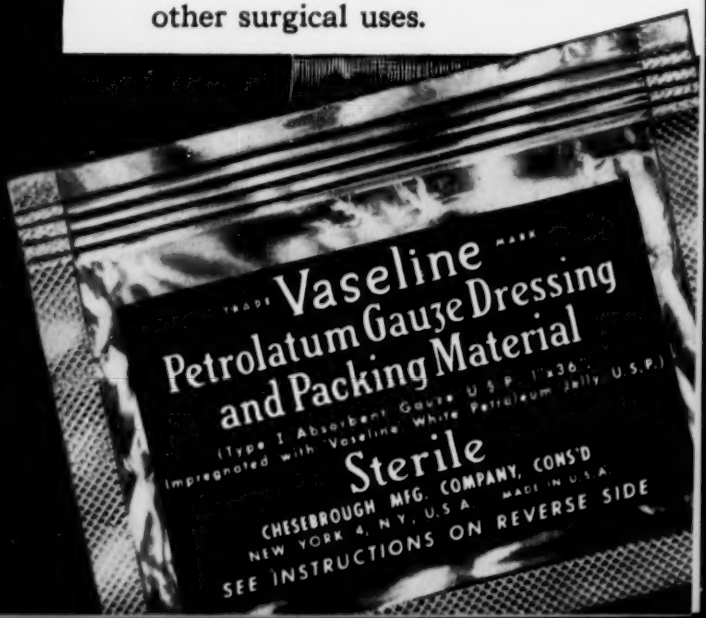
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References: 1. Indust. Med. 20:486, 1951. 2. J.A.M.A., 158:386, 1955.

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